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THE WAR.

THE STRUGGLE FOR THE CAPITAL.

From the commencement of the secession movement, loud threats have been made throughout the seceding States to attack the city of Washington, and either hold it or burn it to the ground. When the news of the fall of Fort Sumter was carried to Montgomery, Mr. Walker, the Secretary of War of the secessionists, gave the watchword, "Now for Washington." At the same time, the call of the President of the United States for 75,000 troops to defend the government aroused the people of the Northern States to the most determined and vigorous efforts to save the national capital. The responses of the several Governors of the Northern States were made with remarkable promptness. Governor Andrews, of Massachusetts, received the requisition for 2,000 troops — the quota of Massachusetts — on the 15th of April, and on the 19th the first regiment arrived in Washington, after fighting their way through the mob at Baltimore. On the same day, the flying artillery, the pet company of Rhode Island, with its six brass field-pieces, "each equal to a regiment," passed through this city on its way to the seat of war. On the 19th, also, the first troops left New York. This honor was secured to the Seventh regiment, which was immedietely followed by others of this city. At the same time, troops were pouring into Harrisburg from Ohio, Indiana and the Northwest.

The passage of the ordinance of secession, in secret session, by the Virginia Convention on the 17th, seems to have been accompanied by a plot to seize the United States armory and arsenal at Harper's Ferry, and the Gosport Navy Yard at Norfolk, as preliminary to the march upon Washington. At the same time the secessionist mob in Baltimore was harangued to prevent the passage through that city of any Northern forces coming to the defense of the capital. The works at Harper's Ferry were under the protection of some forty United States soldiers commanded by Lieutenant Jones, who had orders, in case of the approach of overwhelming forces, to set fire to the buildings and retire. The attempt was made on the 18th, and Lieutenant Jones, in obedience to his orders, burned the works and made a hasty retreat into Pennsylvania. The particulars of this operation will be found in another column.

From mistaken confidence in the loyalty of Virginia, the administration had taken no precautions to secure the Gosport Navy Yard from the treacherous attack of her own people; consequently, the only way in which the powerful instruments of war at that place could be prevented from falling into the hands of the secessionists was to destroy them. We give the particulars of the mode in which this important measure was carried out on another page. It is said that property to the amount of $5,000,000 was destroyed. Among the vessels sunk was the famous old ship of the line *Pennsylvania*, of 3,241 tuns, and 120 guns. But the most serious loss was that of the steam frigate *Merrimac*. She was of just about the same size as the *Pennsylvania* (3,200 tuns), though she carried only 40 guns; but these were of the large Dahlgren pattern for throwing shells, which rendered her a far more powerful man-of-war than the *Pennsylvania*. This was a serious loss to our steam navy.

The operations for cutting off communication with the North will be understood by an examination of the map.

After the fight with the Massachusetts troops on the 19th, the mob at Baltimore went out on the road leading to Havre de Grace, and burned one of the railroad bridges, so as to completely stop the running of cars on this road. They also cut all of the telegraph wires leading to the North, and tore up the rails on the branch leading from Annapolis to the Baltimore and Washington road. The news of this interruption of communication with the capital was flashed by telegraph over the whole North, and created everywhere the most intense and painful anxiety, as it left the heads of government cooped up at Washington with only a few thousand troops, and some of them of doubted loyalty. In this city, the greatest concern was felt for the fate of the Seventh regiment, one of our numerous gallant companies, of which we are so justly proud.

The movements of troops southward, however, continued to be urged with all possible dispatch. On the day and evening of Sunday, the 21st, more than 6,000 left in steamers to go by the Atlantic Ocean and Chesapeake Bay. It was not till the afternoon of Wednesday, the 24th, that the anxiety of this city in regard to the safety of the several regiments was relieved. Two members of the Eighth Massachusetts regiment left the forces at Annapolis on account of sickness, repassed through this city on their way home, and brought the following news. We give their narratives in full.

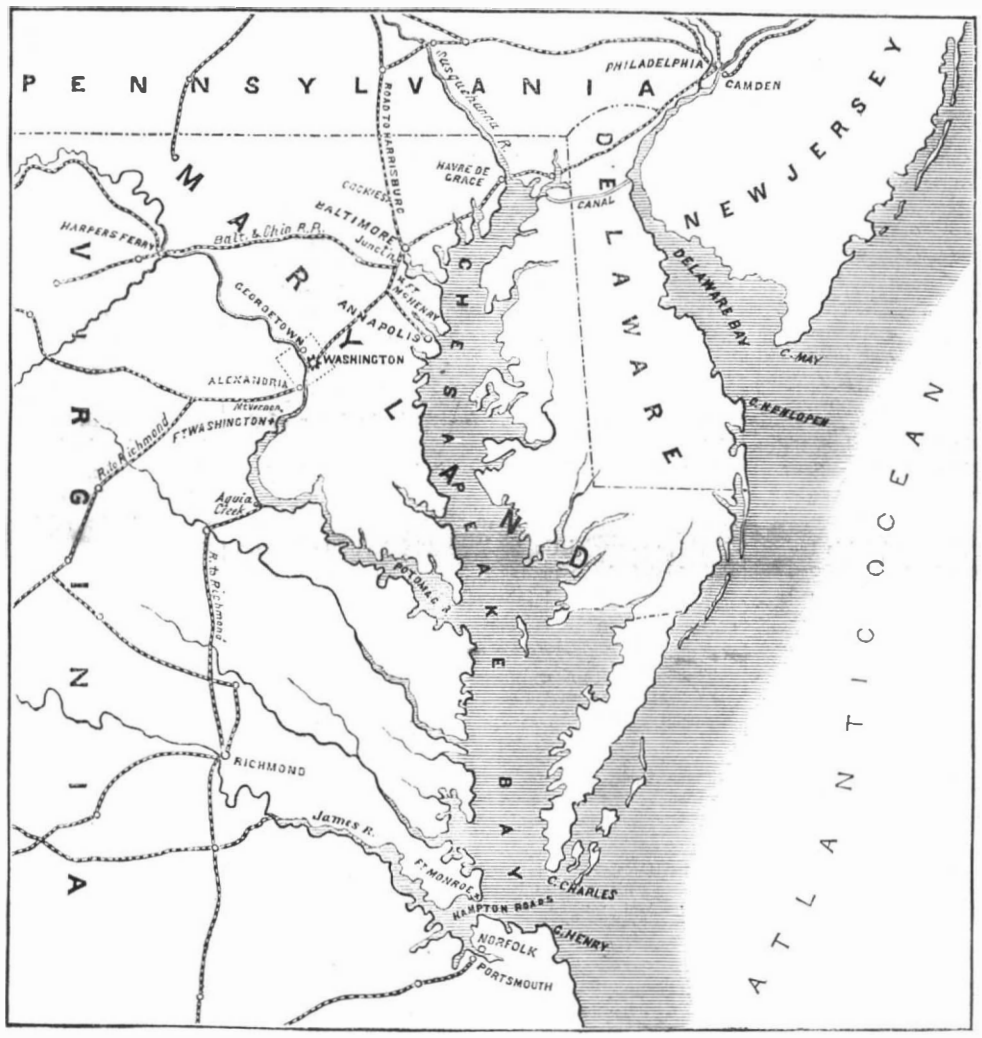
THEIR STATEMENT.

The Massachusetts men took the train from Philadelphia to Havre de Grace, which point they reached in safety on Saturday evening, April 21st. They took possession of the large ferry boat *Maryland*, and went in her to Annapolis. The frigate *Constitution* was lying at the wharf with so few regulars on board that she was in imminent danger of falling into the hands of the secessionists, who had threatened to board her.

The commander was in momentary expectation of an attack, and had his guns double-shotted all around, his boarding nettings up, and all his men armed to the teeth. The steamboat *Maryland*, with the Massachusetts troops on board, arrived at the most critical moment.

The boat being signaled to come alongside, made fast to the frigate, and undertook to tow her into the stream, but both grounded in shoal water, where they remained until the arrival of the steamboat *Boston*, from Havre de Grace, with the New York Seventh regiment on board. The *Boston* made fast to the *Constitution*, towed her off the flats into the stream, and then hauled off the *Maryland*. Two companies from

MAP OF THE SEAT OF WAR.



DISTANCES.

Annapolis to Washington (by railroad), 39 miles.
Philadelphia to Havre de Grace, 62 miles.
Baltimore to Harper's Ferry, 81 miles.
Washington to Richmond, 86 miles.
Baltimore to Washington, 38 miles.
Havre de Grace to Baltimore, 36 miles.
Baltimore to Harrisburg, 93 miles.
Washington to New York, 226 miles.

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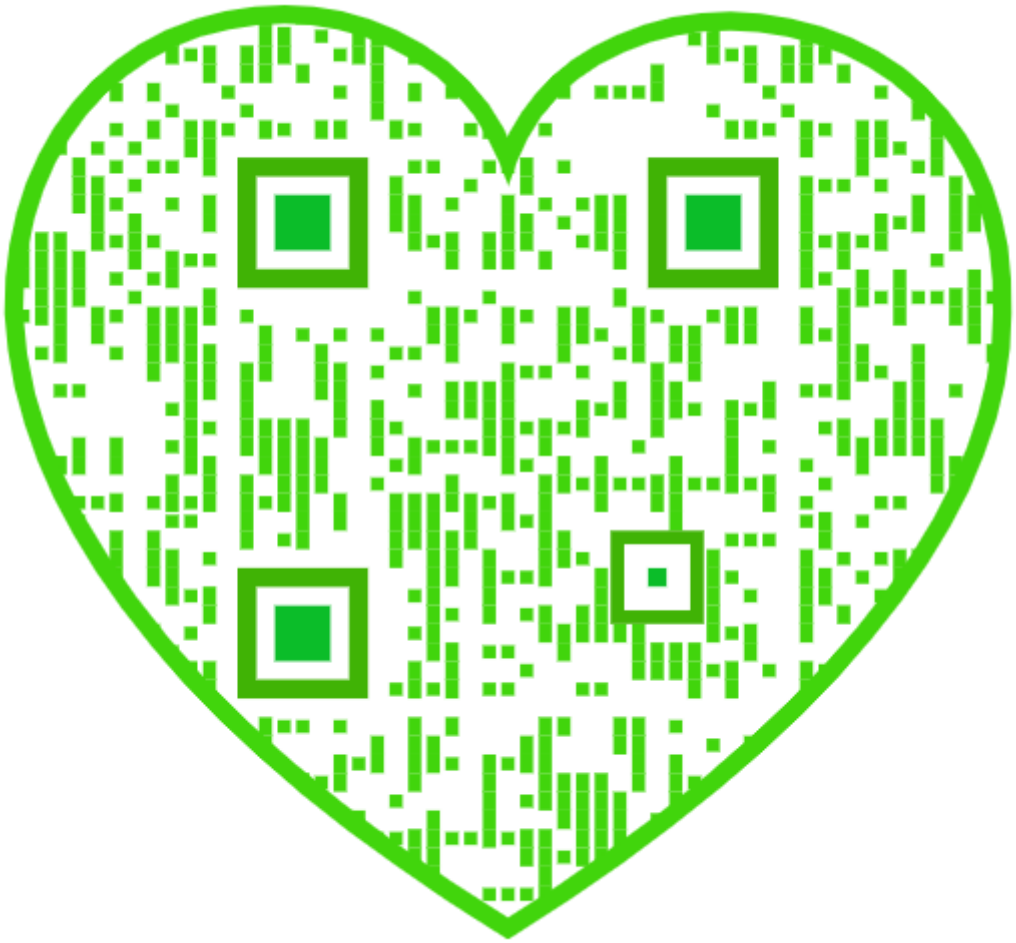

the Massachusetts Eighth were put on board the frigate *Constitution*, to assist in her defense.

The *Constitution* was taken out to the mouth of the harbor, where she anchored, and the Massachusetts Eighth and New York Seventh landed in Annapolis, and were there last night.

General Butler told us last night that he would march last night or this morning if he got news that the other regiments would be there from New York; if not, he would go without them.

They expected trouble in getting to Washington; there were mobs at the villages and along the road, but it was not known that there were any troops on the way. They were principally secessionists in Annapolis, but General Butler was in full command of the town. The band from the Naval School serenaded the regiments. The building is very long, and there is a brass piece at every door. As the city is flat, these might be made to command it. I left Philadelphia with some Pennsylvania troops, who went to arm the ferry boat and take her back. We started from Havre de Grace yesterday morning.

General Butler took possession of all the steamers at Havre de Grace (five), beside a steamtug. They threatened to burn the ferry boat, and swore that no Northern troops should go through. The steamer that carried the Eighth regiment down—the *Maryland*—is still running between Annapolis and Havre de Grace. They are sending down supplies and everything else that is wanted to her. She has now been armed with one 32-pounder and one 12-pound fieldpiece, and about 50 man-of-war's men, all armed with carbines and sabers, under Captain Steadman and Lieutenants Crosby and White, of the navy.

Our troops at Annapolis could not buy a cent's worth; the Massachusetts Eighth were without anything until we arrived. The rails are torn up between Annapolis and Annapolis Junction in different places. No boats are running between Annapolis and Havre de Grace except government steamers.

Communication Reopened.

General Butler, who took possession of the ferry boat at Havre de Grace, was recently the democratic candidate for the Governorship of Massachusetts on the Breckinridge ticket. He is an active politician, and a man of prompt military decision. Annapolis is the capital of Maryland, and the people are generally secessionists. On arriving there with his troops, General Butler told the inhabitants that he was going to Washington, and preferred to ride by the railroad. He was assured that the railroad was destroyed, and that there were no cars or locomotives to run upon it. He proceeded, however, to the engine house, and demanded that the doors should be opened. On meeting with a refusal, he ordered several of the stalwart mechanics in his regiment to remove the doors, "and," says our informant, "they took them away as quickly and easily as Sampson did the gates of Gaza." In the engine house was found a locomotive that had been taken partly to pieces to make it useless, as part of the plan for cutting off communication with the capital. General Butler asked his soldiers if there was any one among them who could repair it. An intelligent looking six-footer stepped out of the ranks, and replied: "I rather think I can, for I made that engine!" and in two hours it was all in order, and the scream of its whistle was ringing in all the ears in Annapolis. Men experienced in the several duties were found to run the engine, man the brakes, feed the fires and conduct the train; and the Massachusetts regiment was started forward, repairing the road as they went, and holding themselves constantly prepared to resist any attack which might be made by the hostile community through which they were moving. They were, however, preceded by the Seventh New York regiment, who marched from Annapolis to Annapolis Junction. Both of these regiments left Annapolis on Wednesday morning, April 24th, and arrived at Annapolis Junction on Thursday morning, the 25th. Here the Massachusetts regiment was ordered to halt to protect this important point on the line of communications, while the Seventh New York regiment was sent forward in the cars to Washington, where they arrived at noon, their arrival giving great satisfaction to the government, as it was thought, with the opening of the route, to make the capital entirely safe from capture at present. On Tuesday, the 23d, the troops which left New York on Sunday in steamers arrived at Annapolis, and up to Wednesday, the 26th, according to the official report of General Butler to Major General Patterson, more than 7,500 had reached that place, enumerated as follows:—

AT WASHINGTON OR EN ROUTE THEREFOR.

The Eighth Massachusetts regiment, 780 men, Colonel Monroe, commanding; the Fifth Massachusetts regiment, 780 men, Colonel Lawrence; Seventh New York regiment, 791 men, Colonel Lefferts; Twelfth New York regiment, 780 men, Colonel Butterfield; Seventy-first New York regiment, 780 men, Colonel Vosburgh; Fourth Pennsylvania regiment, 780 men, Colonel Hartrunft; Fifth Pennsylvania regiment, 780 men, Colonel McDowell; Tenth Rhode Island regiment, 780 men, Colonel Burnside; First Rhode Island battalion of Rifles, 1,000 men, Colonel Burnside.

RETAINED AT ANNAPOLIS.

First Massachusetts company Light Artillery, 109 men, Major Cook; Third Massachusetts battalion of Rifles, 240 men, Major Devons; Sixth New York regiment, 750 men, Colonel Pinckney.

This gives an aggregate of 7,550 men who have reported to General Butler. This does not include several companies from Pennsylvania, which have just arrived.

General Scott must now have an army at his command in Washington of at least 20,000 men.

In the meantime, we have important intelligence from the Southern States. Hon. A. H. Stephens, Vice President of the Confederated States, as the secessionists call their organization, has been making speeches throughout Virginia, to induce that State to join the Southern Confederacy, a step which her people seemed reluctant to take, notwithstanding the Convention has just passed the act of secession. The burden of Mr Stephens' talk is that Washington must be taken. Nearly all the slaves in Virginia are in the eastern half of the State, and here the secession spirit is rampant, crushing out all expression of union sentiments; but in the portion of the State west of the Alleghany Mountains, there are only about 20,000 slaves, and the prevalent feeling is in favor of the Union.

But the attention of the whole country is fixed with the most eager interest upon Maryland. The Governor of the State is a strong Union man, and there is a powerful Union element in the State, but the secessionists have managed to get the control of the Baltimore mob, and it was by their means that the communication between Washington and the North was cut off.

The Baltimore *American*, the official paper, gives this explanation of Governor Hicks' position:—

Governor Hicks has, as yet, taken no final action on the call for troops, and probably will not for some days to come. If the militia are called out in Maryland, it will be under the written pledge of the Government at Washington that they are to be held for the special preservation of the peace and quiet of the State of Maryland, and are not, in any event, to be employed beyond its borders, except in the defense of the national capital, which is part and parcel of the original territory of the State. If they are to be taken into the service of the Government under this agreement, they will remain on duty at Baltimore, and not be required at Washington, whither they can be transported in a few hours. We have reason to believe that this is the extent of the action as yet taken by the Governor, he reserving for future consideration the decision of the question as to whether he will give a favorable or unfavorable response to the requisition of the War Department.

Gov. Hicks convened an extra session of the Legislature at Frederick on the 26th of April, and in his message recommended that Maryland should maintain a neutral position. There are strong signs of the increasing power of the Union sentiment in Maryland, and it is now hoped that that State will be saved to the Union, and saved from the awful destruction that impended over her.

On the 19th of April, the President issued a proclamation announcing the blockade of all ports of the seven seceded States, and on the 29th, he issued a second, including the ports of North Carolina and Virginia in the blockade.

The situation of affairs on the 29th, was as follows: There were from 18,000 to 20,000 troops at Washington, and it is estimated that those moving toward the capital will swell the number to 54,000.

Pennsylvania has been called upon by the general government for twenty-one more regiments, to which she will respond with, the addition of 10,000 men, as a margin to fill up losses caused by battle or disease.

We have news from Savannah that three privateers are fitting out there to prey upon the lawful and peaceful commerce of the country. As the letters of marque under which these corsairs are to sail are issued by no recognized government, they will be regarded by all nations as pirates, and if the crews are caught they will be hanged.

There are signs of a reviving Union feeling in Kentucky and Missouri, and it is hoped that these large border States will remain true to the country.

The greatest activity prevails in all the loyal States in organizing and forwarding troops. Besides the unlimited amounts of money offered in the way of loans to the government, the New York *Herald* has a detailed statement of the free gifts which have been made for the prosecution of the war, and these foot up the astonishing amount of $28,739,000. The accounts from the seceded States are somewhat contradictory, but there appears to be a good deal of enthusiasm for the secession cause, mingled with a terrible disappointment at receiving no aid from the North. Even the Governor of Virginia, it is said, has declared that he will allow no attack to be made on Washington from his State, but this report is not fully authenticated. There are also reports that Jefferson Davis, the President of the "Confederated States," is quite sick, but as the telegraph lines at the South are all in the hands of the secessionists, the intelligence from that quarter is very slow and unreliable. It is, however, fully ascertained that Fort Pickens, at Pensacola, is reinforced, and is entirely safe for the present.

Great activity prevails in all our Navy Yards, in the efforts to complete the blockade of the Southern ports as soon as possible. On Sunday, the 28th of April, the steamer *Niagara*, the largest ship in our Navy, reached this port, from Boston, where she recently arrived from Japan, having carried home the Japanese Embassy.

Governor Letcher, of Virginia, has seized all light draught vessels and steamers for privateering purposes. The regular liners *Yorktown* and *Jamestown* are now being fitted with privateering armaments, and are to be manned very fully. The privateering establishment is very active, and, no doubt, by a week hence, 30 vessels will be sent out from Richmond alone. On the vessels seized, the secession flag was hoisted in the place of our national ensign.

Large bodies of troops are said, by the Richmond papers, to be raising in all parts of Virginia and North Carolina; that batteries are being erected at Portsmouth Hospital and Craney Island, mounting Dahlgren guns, and also that five volunteer companies from Georgia had arrived at Portsmouth. The ladies of Virginia, it appears, are following the example of their sisters at the North, in manufacturing uniforms and clothing for the soldiers.

The road from Annapolis to Washington is well protected by government troops, large bodies of men being posted at intermediate stations, so as to repel all attacks of the secessionists and keep the way open for our troops to the capital. General Butler, of the Massachusetts forces, says that there is a musket guarding every rail between Annapolis and Washington, so that the communication with Washington may be considered intact. Meantime, the superintendent of the railroad has been arrested for taking up the rails. The President ordered the Secretary of War to take possession of the road from the Junction to Annapolis, and the road from Baltimore to York, Pa., known as the Northern and Central road.

It is utterly impossible for any words to convey an adequate idea of the enthusiasm which pervades the whole Northern States, from Maine to Minnesota. In this city it is shown in a thousand ways, but most visibly in the display of the national banner. From every flagstaff in the city the Stars and Stripes are kept flying, they wave from the spires of our tallest churches; and in some of the streets, especially Cortlandt, they are fluttering from almost every window. When the first of the New York regiments were marching out of the city, one of our principal jobbers, who has been largely engaged in the Southern trade, and a very warm friend of the South, was observed swinging his hat, cheering, and perfectly wild with excitement; "I hope they will sweep out the whole South;" "We'll teach them to trample on the American flag." All feelings of party, sect, and class, the love of gain, the love of ease, the love of power, are swallowed up in one all pervading and overwhelming emotion, and that is THE LOVE OF COUNTRY.

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FIRE CLAY MANUFACTURES.

In smelting iron, and several other metals, it would be impossible to conduct the operations unless we were in possession of some substance which will withstand a very high degree of heat without becoming fused. In fire clay we have such a substance, and upon it, when formed into bricks, several of the arts are completely dependent. Although fire bricks are common and well known, we have hitherto found it very difficult to find accurate information respecting their manufacture. At last, however, we have something reliable on the subject, published in the London *Engineer*, in the form of a paper lately read before the Society of Engineers, by H. W. Stephenson. Condensed extracts of this essay will be of interest to many of our readers, as fire clay is found in various parts of our country, while the manufacture of bricks and other articles usually made of this substance is carried on in very few places, and the method of making them is understood by a very limited number of persons.

DEPOSITS AND PROPERTIES.

Among the various deposits which have succeeded the formation of the primitive rocks upon the surface of the globe, there are certain earthy strata of very considerable extent, composed chiefly of silica and alumina, partly in combination, and partly in mere mechanical mixture with other less essential ingredients. These strata are characterized by the very minute state of division of their particles, and their want of firm connection or solidity. It is to their peculiar structure that the most valuable property of clay must be ascribed—that is, its plasticity, or the property of forming dough with water, sufficiently soft to take the most delicate impression from a mold, and so deficient in elasticity that even the slightest indentation is lasting and persistent. Although the clays may be reviewed in general as the remains of certain rocks which have been decomposed by various agents, chiefly atmospheric, which have, in a word, been weathered; yet there are few cases in which the production of clay has occurred in the immediate locality of the rock whence it is derived, and in such a simple manner as to enable its origin to be traced in all particulars, and established indubitably by chemical facts. The most prominent physical properties of clay are its plasticity and behavior when exposed to heat. Exposed to the most intense heat that can be artificially produced, clay refuses to become liquid, and acquires at most a slight degree of flexibility. Its particles then cohere so strongly together that the burnt mass is hard and sonorous. The ingredients which most affect the quality of the clay are sand, iron, lime and magnesia. The plasticity of clay diminishes with the amount of any one of these substances which it contains. The quality is affected in the most marked manner by sand, somewhat less by lime, and very little by oxyd of iron. When clay contains iron and lime the action of heat upon it is very different: the silica, alumina, lime, and iron then form together a mixture similar to that employed in the manufacture of bottle glass, which melts in the fire with more or less ease, according as it contains much or little of the two latter ingredients. Magnesia exerts less influence upon the character of the clay; the more quartz and silica enter into the composition of the clay, the more difficult is it to fuse. Fire clay is commonly found in the coal measures, at a great depth from the surface, but it not unfrequently happens that it lies on the top. Its thickness varies according to circumstances, in some places 3 feet, and in others reduced to 18 inches. As a rule it is very strong and hard, and cannot be worked to advantage without the aid of gunpowder.

TREATMENT OF THE CLAY.

The clay on being raised to the surface is laid out in long parallel heaps, say 20 feet high, being 20 feet wide at the bottom, and tapering to 5 feet at the top. A series of ridges is thus formed, purposely, however, in order to collect as much rain as possible, which, combined with the direct action of the atmosphere, soon reduces that which was at one time hard and retentive, to a soft, comparatively plastic state. Difference of opinion exists among manufacturers as to the policy of adopting this system, inasmuch as to carry it out fully a very large capital is necessary, and which for the time being lies dormant. The sole advantages accruing in keeping so large a stock is, that it is more easily pulverized and reduced to power, thereby causing a considerable saving in engine power, labor and expense. To carry out this method to its fullest extent no clay ought to be used until it has been exposed to the action of the elements for at least two years. It might not be always convenient to lay out so much capital in dead stock. After the clay is brought to the works the first process is that of grinding—the most approved plan is that of two large stones, 10 feet in diameter, and 20 inches wide, hooped all round with iron, and revolving slowly on a cast iron pan, or bed-plate, which in some works is also made to revolve very slowly the contrary way to the stones. The rough clay from the pit being conveniently placed for the workman, is cast under the edge stones, when it is ground to a coarse powder, which falls through an open grating in the center of the bed-plate, whence it is lifted in the sifting cylinder by an endless chain of buckets. The clay, as it passes down the cylinder, is separated into two parcels, the coarse, or that which is too large to admit of its being passed through the meshes of the cylinder, is returned by a long wooden spout to the mill, where it a second time is ground, whilst the fine particles are received into an endless belt composed of glazed sack cloth, and conveyed into the mixing pan, or pug mill. Up till within the last few years the process of pugging was performed entirely by the feet. The pug mill consists of an upright cylindrical vessel about ten feet high and two feet in diameter; a vertical shaft with horizontal arms works in the axis of this cylinder; the clay is put in at the top, mixed with water, and in due time passes to an aperture at the bottom from which it is taken out. Some manufacturers prefer allowing the pugged clay to lie and *sweat* for a few days in a dark place, thereby giving greater ease and facility in working, the clay being rendered of a more plastic nature by the delay. Others remove it immediately from the pug mill to be molded into bricks, retorts, &c.

MOLDS.

Brick molds are made in a variety of ways, some of brass cast in four pieces and rivetted together, others of sheet iron cased with wood in the two longest sides. Iron molds are sanded but not rivetted. Brass, or, as they are technically called, copper molds, are an improvement on the iron, as they are better than the iron. They require neither sanding nor wetting, and do not rust. They, however, are expensive, and do not last long, as the edges become worn down so fast that the bricks made from the same mold at the beginning and end of the year are of different thicknesses, and cannot be used together. This is a great defect, and a metal mold which will not rust nor wear is still a great desideratum. It is essential that the sides of the mold should be sufficiently stiff not to spring when the clay is dashed into it, and it is equally requisite that it should not be made too heavy, or the molder would not be able to work it with ease and facility. The cost of molding bricks by hand is small in proportion to the total cost. The workman is supplied with a stock of clay (from the pug mill) by his side, a table or bench before him, and two boys or helpers. The mold (brass) is larger in proportion to the finished brick, owing to the contraction of the clay in drying and burning; this, of course, varies under different circumstances, the tougher and finer the clay the greater the contraction, and *vice versa;* in general, one inch to the foot is the calculation for contraction, and the molds must be made accordingly. The usual form of a brick is a parallelopipedon, about 9 inches long, 4½ inches broad, and 2½ inches thick, the exact size varying with the contraction of the clay. The mold itself only makes the four narrow sides of the brick, the one broad surface being produced by the table which supports the mold, the other by a straight piece of wood, with which the workman removes away the excess of clay, by drawing it straight along the upper edge of the mold. To prevent the clay adhering to the mold, it is from time to time damped with water, which causes the molded brick to separate from the mold without bending or loss of time. The molded bricks are taken away and empty molds brought back to the molder by boys. The bricks are placed in long rows edgeways on the dry flats, a space equal to the thickness of the board, say ¼ of an inch being left between each brick, in order to give vent to the steam generated in drying. The drying sheds or flats consist of long floors, say 90 feet by 30 feet, with flues running the whole extent of the building. It is desirable not to have the length of these flues more than 20 feet, in order to ensure a good draught without any additional coals being used. In most manufactories these drying flats are so constructed that there is ample room for accommodation for two days' work; in this case the molders are never stopped, and are not required to remove their tables or benches from place to place. From thirty-six to forty-eight hours is calculated quite sufficient for drying bricks; so that while the molder and his boys are depositing bricks on one part of the flat a gang of men and boys are engaged in clearing away the bricks from another part. The number of bricks which a workman can mold in a day of ten hours is always very considerable, but depends very much upon the ability and strength of the moulder. With clay in good order a skilled workman can make 2,000 to 2,500 marketable bricks in a day; thus, taking 2,000 bricks as a fair average day's work. Three kinds of machines are used to a limited extent in fire-brick making. One class operate in a manner similar to hand moulding; another have rotary molds, while a third class roll out the clay in a continuous strip which is cut off into the lengths of common bricks. American brick machines are suitable for molding fire clay.

KILNS.

After the molded bricks have been allowed to remain in the sheds until they are uniformly dry, and have become sufficiently hard for burning, they are built up in kilns. The drying operation requires care and attention, so as to allow each brick to be dried equally in all parts. Bricks are burned in a variety of ways. In Staffordshire, cupolas or circular kilns are used. They are arched over the top like domes. The fire holes are openings left in the wall, and these are protected from the wind by a low wall built outside, with a space for the firemen inside. In the Newcastle district, the rectangular kiln is the most common. It is formed of four walls, inclosing a rectangular space, with a narrow doorway at one end, in which end there are also arched openings for firing. The usual method of placing bricks in the kiln is to cross them, leaving spaces for the passage of the heat. When the kilns are first lighted, the heat is raised very gradually, so as to drive off the moisture gently. When steam cease to arise, it is a sign that the water has all been driven off. The fires are now increased, and the heat raised to a high degree. As the heat becomes intensified through the kiln, the fire holes are covered with iron doors to check the draft. When the firing is completed, the fire openings are plastered up with clay, and the fires are permitted to die out gradually. The quality of the bricks will be injured if the kiln is opened before they become perfectly cool. Under ordinary circumstances, a kiln containing 12,000 bricks requires about five days to complete the burning process, and about 15 tuns of coal are necessary for this purpose. It is difficult to tell what degree of heat is required in burning such brick; this is left to the practical skill of the person who has charge of the kiln. There are various kinds of fire clay, and it requires experiment to determine the quality of each. It should be infusible in the fire, and not subject to crack and fly in pieces. The great refractory element in it is silica—pure sand. An excellent clay consists of silica 71.28; alumina, 17.75; oxyd of iron, 2.43; lime and magnesia, 2.30; water and organic matter, 6.94.

WHAT IS TREASON?—Judge Betts of the United States Circuit Court delivered, April 24th, an important charge to the Grand Jury on the law of treason and piracy. He defines treason to include acts of building, manning, or in any way fitting out or victualing vessels to aid the enemy; sending provisions, arms, or other supplies to them; and raising funds or obtaining credit for them. Any person cognizant of such acts who does not promptly inform the authorities is guilty of misprision of treason, the punishment for which is seven years imprisonment and a fine of $1,000.

THE Tenth Company of the Massachusetts Eighth regiment, under Captain Briggs, made a bold *coup* on Friday night. They started for Baltimore in a steamtug, cut out the receiving ship *Alleghany*, lying in the harbor, and anchored her safely under the sheltering guns of Fort McHenry.

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PRACTICAL WARFARE.

RIFLES AND SHOOTING.

We wish to disseminate among the people useful and accurate information on this subject. The great essentials of modern infantry tactics are quick and steady movements, combined with rapid and accurate rifle shooting. A complete revolution has been effected in the army exercises in Europe within ten years, and few of our citizen soldiery seem to be aware of the fact. Every soldier and citizen should now make himself acquainted with field exercises, by shooting at targets at various distances, from 200 up to 1,200 yards, while performing rapid evolutions. All our citizen soldiers require considerable severe drilling in the field, so as to become quick and accurate marksmen. Some general and plain instructions on this topic will be useful to all.

The first thing necessary for a soldier is a trusty rifle. It should be easily and conveniently charged, and its fire should be certain and effective. It should be capable of destroying an enemy at the distance of 1,200 yards with its bullet, and it should be effective in hand-to-hand combat with a sword or bayonet attached to it. A soldier should, therefore, know what his rifle can do, and what he can do with it, at certain distances. If he is ignorant of these, let him be taught before sending him to fight.

The accompanying figure represents a light infantry soldier firing point blank. The trajectory of the projectile or bullet is shown, together with the several forms of bullets used in European armies, also the American picket bullet and army cartridge.

THE BULLETS AND BORES.

Bullet No. 1 is that of the British Enfield rifle. Its form is defective. The front is too blunt, and the cylinder too long without a groove. No. 2 is the American picket bullet, without a chamber to adapt it for quick loading. When solid it carries more accurately. No. 3 is the French Delvigne bullet—it is good. The friction is but limited, as it comes only upon the two rings, and the groove is wound with a greased cord. This lubricates the missile, and tends to keep the bore clean. Nos. 4 and 5 are views of the famous Swiss bullets, with sections of their rifles. Their accuracy is remarkable. At 800 yards distance they strike targets of 4 by 6 feet 66 times out of 100 shots. No. 6 is the most highly approved French bullet, with a section of its hollow chamber, which is a three-sided pyramid. This bullet was adopted after a great many experiments as being the best. No.7 is a double-ringed bullet with a chamber; it is good for rapid loading. No. 8 is the American cartridge, with a conical ball having three grooves. Formerly, the United States cartridges contained a ball and three buck shot.

The hollow chamber in a bullet is to admit of rapid loading. The powder expands the lead, fills the bore, and prevents windage, therefore they are not required to fit so snugly at the muzzle. A heavy bullet has the greatest range. By making it long-cylindrical in form, greater weight is secured, but such bullets must have rings or grooves in proportion to the length of the cylinder, so as to lessen the friction.

PRINCIPLES OF SHOOTING.

The general principles of firing, applicable to all rifles and fire-arms, are deduced from the positions of three lines relatively to one another, namely, line of fire, line of sight, and the trajectory. The line of fire is the axis of the barrel prolonged indefinitely; it is the line along which the center of the ball is directed. The line of sight passes through the bottom of the notch in the rear sight of the rifle and the upper edge of the front sight. To *aim* is to direct the line of sight upon an object, as shown in the figure. To do this correctly, the rear and front sights of the rifle and the point or object aimed at must be in the same straight line. If the rifle has been properly tested, if it is accurate in projecting its missile, a man with a clear eye, a steady hand, and a cool head, will soon make a good marksman by carefully sighting his object, if he loads his rifle carefully.

The trajectory is a curved line described in the atmosphere by the center of the bullet in its flight. The trajectory and the line of fire become more separated as the distance of flight increases. The line of fire is above the trajectory. The bullet, during its flight, is subjected to the action of three forces, viz., the impulse of the powder, the resistance of the air, and the action of gravity. The air tends to divert it from its right line of flight and shortens its range; gravity gradually brings it to the ground. The more flat the trajectory line, the more dangerous is the shooting. In order, therefore, to obtain accuracy of fire, it is necessary that the soldier should be able to judge of his distance from the object to be struck, so that the

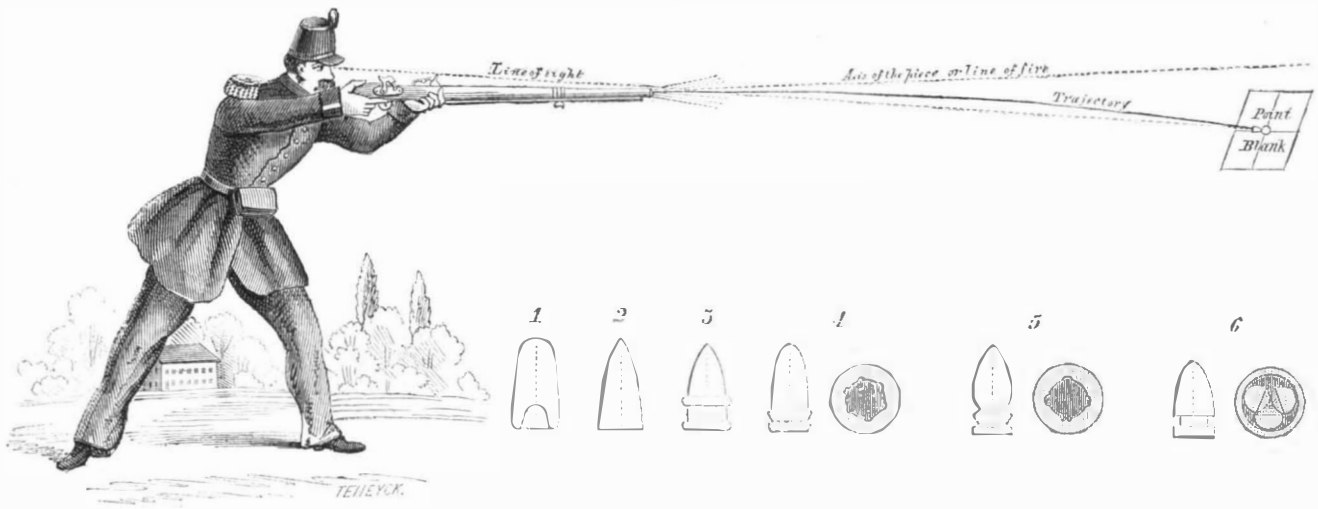
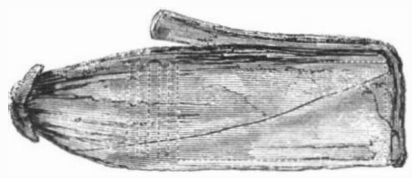


Fig. 8.



bullet may not be directed to fall within or beyond point blank distance. The mode of appreciating distances by the eye alone should be constantly practiced and there is no other proper way of doing this than by firing at a target, first at measured distances, then at targets where the distances are not measured. There are instruments for measuring distances by inspection, such as the "tige" and "stadia," but soldiers have no time to use them in an engagement. They may be sometimes very useful in skirmishing, and each officer should carry one; but the great effort of the soldier should be the cultivation of the sight and judgment for rapid firing with the fewest and most simple devices.

AMERICAN ARMY RIFLES.

The rifle-muskets in our regular army have their grooves with a twist of one turn in six feet, and decreasing in depth from breech to muzzle. This makes the cartridge a little stiff to leave the muzzle, but its shooting is more accurate on this account. The ball has three grooves around the cylindrical part and no wedge or capsule is used inside. The weight of the ball is 730 grains, the charge of powder is 70 grains. The barrel of the rifle-musket is 40 inches long, and entire, with bayonet, 73.85 inches. The army rifle (not the rifled musket) is 33 inches long; with bayonet the weapon is 71.8 inches long. The total weight of the rifle-musket is 9.90 pounds; that of the rifle, with bayonet, 12.98 pounds.

The United States rifles are fired without patches. The rifles and rifle-muskets of our army compare favorably with those of the Europeans. They are like those of England; the latter were adopted from American models. No target practice in our army has, however, been ever reported to equal that of the Swiss, English, Austrian or French soldiers.

BREECH-LOADING RIFLES.

A Board met at West Point, four years ago, to test breech-loading rifles. They experimented with quite a number, subjecting them to target firing. A Sharpe's rifle was fired 18 times in 50 seconds; but Colonel Burnside's was considered the best. A second Board met in 1858, and again decided in favor of Burnside's, but did not recommend it. Colt's revolving rifle is like his pistol, in the principle of its construction. It has seven grooves of uniform depth and increasing twist. There are very few breech-loading rifles in the army; they are not so accurate as those which load at the muzzle, and they are more complex in construction.

SCHOOLS FOR RIFLE PRACTICE.

Shooting schools have been established in all the European armies, and at West Point the cadets are also regularly instructed in firing at the target, but only at short distances. In England the shooting school is at Hythe. The term in it occupies two and a half months. Detachments of the regiments succeed each other there during the entire year. In France the term of practice occupies four months. Practical instruction is given to the soldiers in estimating distances by the eye, and in rapid accurate firing. Such an establishment should be commenced in New York at once.

OLD FIRING.

It has been said that "the battles of the American Revolution were gained by the rifle." The British soldiers were not then instructed to shoot at a mark; but those days are all past forever. At the battle of Vittoria, in Spain, 800 balls were fired for every man that was killed. At the battle of Cherubusco, in Mexico, 125 American balls were fired for every Mexican that was killed; this was better firing than that of the enemy, who fired 800 balls for every man killed on our side. This, however, will not do now. In England a party of 30 skirmishers can destroy a battery of light artillery, at 800yards distance, in one minute.

NEW MILITARY TACTICS.

In the olden times, the solid columns and the desperate charge generally won the battle; but light, active troops, spread over an extended field with good rifles, would soon slaughter the best drilled columns in the world, armed with smooth-bored muskets and handled in the old-fashioned pasteboard style. Modern tactics require a more extended field for manouvering, hence greater care is necessary in handling the soldiers, and more intelligence on the part of the soldiers is necessary for taking up proper positions, to save themselves and harass the enemy to the greatest advantage. Formerly the position of an army could be approached within 300 yards without experiencing injury from infantry fire. With the modern rifles, they could not approach nearer than 1,000 yards. Cavalry must now keep at a respectable distance until they can dash in under cover of the smoke, or be preceeded with riflemen and artillery.

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Gunpowder Manufacture.

The invention of gunpowder is claimed by the Germans for their countryman, Bertholdus Schwartz; but it is well known to have been in use among the Chinese since A.D. 85.

Some of the best qualities are composed as follows:

	NITER.	CHARCOAL.	SULPHUR.
Army powder.....	75	15	10
Sporting.....	78	12	10
Mining.....	65	15	20
French.....	78	12.88	9.12

The ingredients are first reduced to an impalpable powder in cylinder mills worked by water power, or between metallic rollers. It is next weighed, then properly mixed in a mixing trough with a wooden roller for three hours, and at some mills it is merely stirred about in a large tub for a short time; but when this is the case, more time is allowed for incorporating, which is the next process. The cylinders of most incorporating mills are two in number, and made of a very tough description of stone; they each weigh about three tuns. The bed of the mill on which they revolve is of the same material; but cylinders and beds of iron are also much used. The objection to iron beds is that they generally wear hollow in the middle, and it would be out of the question to have stone cylinders and iron beds. The charge which is placed in the mill at a time is 42 lbs., and it is moistened with 2 pints of water, which is placed in the mill with the charge; but this is varied according to the state of the atmosphere. At the end of three hours, the charge is withdrawn from the mill to be pressed either in a hydraulic or a powerful screw press; it is separated at equal distances by plates of copper so that a uniform pressure may be applied to the whole, which is about 600 tuns. When taken from the press it is in thin solid cakes or layers, called "press cake." This is broken in pieces of about a quarter of an ounce in weight, and removed to the corning house where it is granulated by placing it in sieves having a rotary shaking motion given to them by machinery, with two blocks of lignumvitæ wood which crush the powder between them and the sides of the sieve; two other sieves of different degrees of fineness are placed under the first, which catch the powder and separate it into fine and coarse grain (for artillery and muskets), and the dust, or meal powder, falls into a box placed beneath. The powder is now glazed by being placed in a cask, which revolves on an axle through the center about thirty times in a minute, which takes off all the corners of the grains and gives them a polish.

The last process is drying, which is performed by steam, radiation from hot irons, or solar heat; it is sometimes again sifted before barreling, to clean it and prevent it from caking together. The pressing and glazing processes, although they lessen the effective force of the powder, are absolutely necessary; first, to give the powder density, to prevent its breaking by carriage; second, to prevent its absorbing moisture from the atmosphere, which it is liable to do from the alkali which is in the charcoal; third, to prevent the powder losing its power when kept for any length of time. The quality of the powder produced depends more on the care taken in its manufacture than on the exact proportions of the ingredients.

Rations for Troops.

At the Division Armory in this city, General Yates has ordered the troops to be supplied as follows:—

For breakfast, at seven A. M., there will be furnished for each man provisions in the following quantities:—One quart of good coffee, eight ounces of bread, and three-eighths of a lb. of beef.

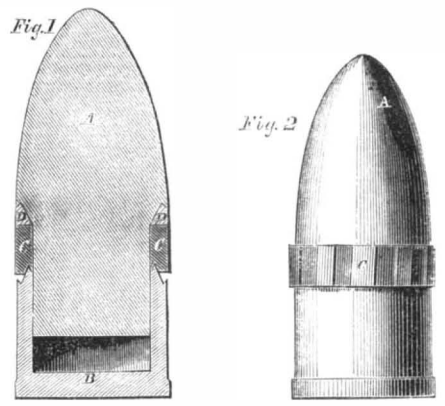
At twelve M., for dinner:—Five-eighths of a lb. of beef or mutton, well cooked, with potatoes; one quart of baked beans to every ten men; and every other day, in lieu of baked beans, rice, bean or vegetable soup will be furnished at the rate of one pint per man.

At five P. M., for supper:—Eight ounces of bread, three pints of coffee, one quarter lb. of cold beef or mutton. The coffee to be furnished will be properly sweetened, and milk in due proportion will also be provided.

SCIENCE IN CALIFORNIA.—In San Francisco, there is an association of scientific men who meet weekly and discuss questions of science. It is named The Academy of Natural Sciences, and numbers among its members several very distinguished persons. The Germans in that city have also formed a scientific club called the Naturwissenschaftlicher Verein. Every subject is treated in the German language.

HOTCHKISS' RIFLED CANNON BALL.

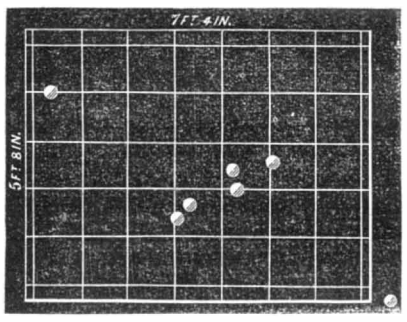
We present this week, as peculiarly *apropos* to these warlike times, an illustration of the Hotchkiss projectile, which has elicited considerable attention of late, and also some samples of target practice therewith. Fig. 1 represents a section of the projectile before firing, and Fig. 2 is a view of the same after firing, showing the manner in which the leaden packing takes the impress of the grooves in the gun. The shot is made in three pieces, and has, when finished,



an elongated conoidal form, with a band of soft metal near its center. A is the main portion of the projectile of the form shown in Fig. 1. B is a cap fitted to slide on to the tail piece of A. C is a belt of lead or other suitable metal, which will be readily compressed and forced outward when, by the force of the powder, the cap, B, is driven home. D is a quantity of grease or greasy cotton.

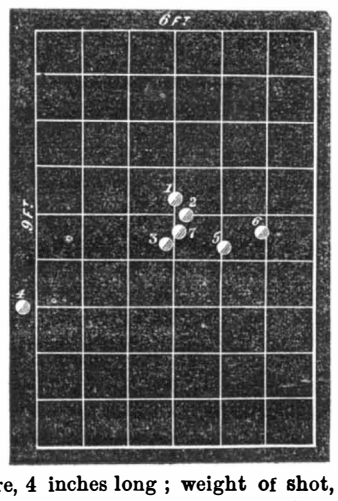
The shot is introduced into the gun, which may be any muzzle-loading rifled piece, with the cap, B, next the powder. On the discharge, the first action of the expansive gas is to drive forward the cap B upon A, thereby forcing outward the belt, C, causing it to fill the spiral grooves of the gun, preventing windage and giving the proper rotary motion to the shot. The grease, D, is by this movement also forced outward and lubricates the gun.

This is a view of a targer after practice with this projectile at Flushing, L. I., Oct. 24, 1859, before officers of the Mexican Liberal government. Length



of cannon 3 feet 10 inches; bore, 3 inches; weight, 583 lbs. Weight of shot, 9¾ lbs.; weight of charge, 10 ounces. Distance of target, 1,760 yards, or one mile; number of shots fired, 8.

This is a view of a target made with this shot on the 19th of February last, with an iron cannon of 2½



inches bore, 4 inches long; weight of shot, 5¼ lbs.; weight of charge, 5½ ounces; distance of target, 1,000 yards; elevation, 3¼°.

This projectile is cheaply constructed, and does not throw off any fragments between the gun and the object struck. The projecting lips on the parts A and B, cut into the belt and effectually prevent any portion thereof leaving the shot, even if it should split in expanding. The end, E, of the cap, B, is accurately turned to fit the bore of the gun, and serves to steady the shot, and hold it in the line of the axis, thus insuring accuracy of flight. By the use of the grease, D, immediately in front of the expanding belt, the lubrication is so perfect, that in practice it is found there is no tendency to "lead" the grooves or fill them with portions of the soft metal belt.

This projectile was patented by Andrew Hotchkiss, Oct. 16, 1855, and by B. B. Hotchkiss, July 24, 1860. Further particulars may be obtained by addressing Messrs. Hotchkiss & Sons, No. 80 Beekman street, New York.

Council to our Volunteers.—How to Prepare for the Campaign.

[The following hints to our volunteers are timely and should be heeded.—EDS.]

TO OUR YOUNG SOLDIERS.

1. Remember that in a campaign more men die from sickness than by the bullet.

2. Line your blanket with one thickness of brown drilling. This adds but four ounces in weight and doubles the warmth.

3. Buy a small india rubber blanket (only $1·50) to lay on the ground or to throw over your shoulders when on guard duty during a rain storm. Most of the eastern troops are provided with these. Straw to lie upon is not always to be had.

4. The best military hat in use is the light colored soft felt; the crown being sufficiently high to allow space for air over the brain. You can fasten it up as a continental in fair weather, or turn it down when it is wet or very sunny.

5. Let your beard grow, so as to protect the throat and lungs.

6. Keep your entire person clean; this prevents fevers and bowel complaints in warm climates. Wash your body each day if possible. Avoid strong coffee and oily meat. General Scott said that the too free use of these (together with neglect in keeping the skin clean) cost many a soldier his life in Mexico.

7. A sudden check of perspiration by chilly or night air often causes fever and death. When thus exposed do not forget your blanket.

"AN OLD SOLDIER."

Revolving Steam Fort.

A French mechanic by the name of Balbi has lately invented a new fortress, which works upon a plan that must astonish any hostile party that shall attempt to take it by assault. The new battery is in the shape of a round tower, surrounded by a gallery and regularly pierced for cannon, the motive power which regulates its movements being steam. It is to be used in cuirass of iron plates, and so managed that on the first attempt at an escalade on the part of an enemy, the tower begins to revolve which renders it inaccessible, while, for the same reason, the picking off any enemy of its defenders by the truest rifle becomes a matter of infinite difficulty. It can be propelled, like any conveyance moved by steam apparatus, from place to place with similar speed. Its base is thickly set with pikes, which, once in rotation, would annihilate all who might approach.

The Lawyers Loyal.

One of the largest and most enthusiastic meetings of the Judiciary and New York Bar which had as yet been held in this city, took place 23d ult. All the Judges were present, and the Court room was crowded by the leading members of the profession. In the space of one hour and a half, $25,780 were collected, which speaks sufficiently for the patriotism of the legal profession. Volunteer regiments were also spoken of, and from the proceedings of the meeting our readers will perceive that the "Judiciary and Bar of New York" have awakened to the danger which is around, and have firmly resolved to face it.

It is also worthy of note that His Honor Judge Barnard, of the Supreme Court, and Judge McCunn, the City Court, have entered the army as Colonels of regiments, and are prepared to take the field. Judge Slosson has sent his only son and two nephews to do battle for the flag of the country.

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THE CHINESE SILKWORM.

Its Products a Substitute for Cotton in France, with Remarks on some of our own Native Silk-Spinners.

Read before the New York Lyceum of Natural History on Monday, April 8, 1861, by Dr. J. Eights, of Albany.

[Reported for the Scientific American.]

I find in the *Gardeners' Chronicle*, of London, for December 22d, the following interesting notice of the Chinese silkworm recently introduced into the dominions of France, and deem it well worthy a free dispersion throughout this country:—

In March, 1859, M. Guérin Méneville addressed a note to the Emperor on an introduction into France of a new kind of silkworm, living in the open air on a very hardy plant (the *ailante*, or Japan varnish tree), and producing two crops a year of a strong silky fiber employed for centuries past in China to make clothes for the great mass of the population. The object of this note was to request the Emperor to provide the means of making an experiment on a large scale for the rearing of this silkworm. The authority was immediately granted, and the imperial domain of Lamotte-Beauvron was selected as the place. The result is now published, and it surpasses all expectations. The new silkworms have likewise been reared in great numbers at Toulon, on the estate of M. Diguillon, and at the château of Coudra, near Chinon, the property of Count de Lamotte-Baracé. More than three-fourths of the worms produced excellent cocoons, though the condition of the atmosphere was very unfavorable; and it is now fully ascertained that the new worm gives a profit of cent per cent, and often much more; whereas, the mulberry silkworm is reckoned very successful when it makes a return of 15 per cent on the capital employed. The silk of the ailante worm differs essentially from that of the mulberry worm. It is of an inferior quality, well adapted for coarse fabrics, and cannot enter into composition with that employed in the rich tissues of Lyons. The varnish tree will grow on the most barren soil. The cocoons may be prepared by the peasantry themselves, whereas, the ordinary silk requires much skill and care in dressing it. The new silk will form an excellent substitute for cotton, of which France annually imports 69,504,000 kilograms from the United States. M. Guérin Méneville proposes to call the new silk "ailantine" or "cyanthiane," in order to distinguish it from the other kind in use. He is now studying the best means of promoting the production and manufacture of the new silk, which he positively declares will ere long supply the chief clothing of the people.

The sample of woven silk has much the appearance of nankeen—rather coarse, and very strong—and would not be taken for silk by any ordinary observer. It may be as well to mention that the ailante on which the worm feeds is the *ailanthus glandulosa*, so common everywhere about the streets of our city.

We were pleased with the above extract for many reasons. In the first place, we are now in hopes that the ailanthus tree, which has hitherto been considered a useless incumbent of the soil, may eventually become of no little importance to our community, thriving with such profusion as it naturally does, with seemingly so little or no care. This is more peculiarly the case in the Southern States, where it has already attained to almost perfect domestication, notwithstanding that it had been for some time discovered, that its introduction was likely in most instances to prove a serious misfortune to many of the planters, who had hitherto placed it about their dwellings as a portion of their ornamental decorations. Growing with such unusual fecundity, it has been found as speedily to abstract from the atmosphere and soil an immense amount of their nutritious qualities, by that means depriving the more useful trees, shrubs and plants of a vast proportion of the necessary nourishment that they absolutely require for their more perfect development, rendering them at the same time exceedingly feeble, and sometimes producing a premature decay. They have likewise been found in many instances to encroach upon the borders of the forest, and materially to affect the healthy condition of the trees.

In the foregoing extract, a scientific description and even the name of this interesting insect has, unfortunately, not been given; consequently, we are unable to determine, with any degree of certainty, how nearly it may approximate to some of our own native species.

But that to which I would more earnestly desire to concentrate the attention of your readers, is to an investigation, and consequently to a more perfect knowledge of the numerous species of silk-spinning *lepidoptera* that are indigenous to this country, with only some very few of which but imperfect attempts have as yet been made to procure and manufacture silken garments from the fibres reeled from the cocoon. Two only of these from the multitude will be sufficient at present to enumerate, and they are of almost daily occurrence in our gardens during the season of summer.

The first is our largest sized brown-colored moth, whose fleshy, green caterpillar is so commonly to be met with feeding promiscuously upon the leaves of shrubs and trees, but more particularly on those of the lilac and various other plants of that description. This is the *saturnia cecropia* of recent etymologists. In the Fall of the year, when it forms its cocoon upon the slender twiggs of the trees, it invariably envelopes itself in a copiously-woven mantle of coarse silken fiber of great thickness, and of such exceeding strength as to be with difficulty broken by the hands.

Another species is the *saturnia promethia* of the same authors, a much smaller moth, but strikingly resembling it in appearance. Its habits are nearly the same, but it more strictly confines its depredations to the leaves of the lilac, and its cocoons are almost invariably consigned to its twiggs.

About forty years since these identical species were sent from this country to France for the purpose of experiment; they there procured the silken fiber from the cocoons, and endeavors were then made to have it woven into fabrics for general and domestic uses. The experiment, it was stated, in return met with the most perfect success, and the cloth so manufactured, although rather coarse in its texture, proved of the utmost strength, and of lasting durability—so much so that the garments constructed from the thread were supposed capable of descending from one generation to another, as heirlooms in the families of those who were fortunate enough to possess them; it being almost impossible to rend or fracture them by the roughest usage.

This being the case (and we have the best of reasons to believe in its authenticity), would it no be desirable to have the experiment fairly tested here at home by feeding these larvæ upon the leaves of the ailanthus, or by placing them upon its branches whenever found, and thus rearing them from the young stage until they become matured sufficiently to weave the cocoon and pass into their pupal condition? Then, merely by reeling the silken fiber, the result can easily be obtained. No difficulties or expense will become necessary; and should success follow the attempt, a new and highly useful material of commerce, and consequently of wealth, will be introduced into our country, as well as an extremely beneficial application to the arts.

Since penning the above remarks, we have been favored with a perusal of the January 12th issue of the *Illustrated London News*, which contains, beside a brief, although imperfect description of the Chinese silkworm, a beautiful engraving of the insect in the larvæ, pupa and perfect condition. It proves to be the *saturnia cynthia* of authors, a species so closely allied to the *saturnia cecropia* of our own country, mentioned above, both in its habits and appearance, that it is almost impossible, without the closest scrutiny, to distinguish them from each other, fully confirming the opinion previously expressed, that our native species may advantageously be substituted in the place of that from the Celestial Empire.

The *cecropia*, as we have stated is a promiscuous feeder in our gardens, and consequently may easily be induced to take to the ailanthus in the open air or to some other native vegetable which, we doubt not, is fully, if not far more perfectly adequate to the purpose, and by that means will easily obviate all the difficulties and objections that must necessarily arise from the perplexing annoyances of an indoor feeding, which is most generally the case in rearing the mulberry silkworm in our dwellings.

Should success in any way attend the endeavor to cultivate silk from the thread of any of these moths, there are many other species of our numerous lepidoptera that might easily be brought into requisition.

[Dr. Eights is one the most distinguished naturalists in our country, and whatever he suggests deserves very general attention.—Eds.

Rolling up Bandages.—This may be done in the most expeditious manner by simply attaching a piece of strong wire to the driving shaft of a Wheeler & Wilson's or other sewing machine, and rotating the shaft so as to wind the bandage upon the wire. Ladies, take notice. We have seen excellent specimens of rolled bandages done in this way.

Steamships and Boat Building.

At Williamsburgh, N. Y., there was launched on the 4th ult., from the yard of Lawrence & Foulks, the side wheel steamer *Parquete de Maule*, designed for the trade between Valparaiso and Constitucion, on the coast of Chile, and the first vessel ever built here for that trade. She is owned by Mr. George K. Stevenson, of Philadelphia, who is at present residing in Valparaiso. She is strongly built, having all the power of an ocean steamer. She will be furnished with two engines, built by Messrs. Boardman, Holbrook & Co., of the Neptune Iron Works. Their power is about 300 horse, or 150 horse each. They are 32-inch cylinders, with a stroke of 8 feet. Dimensions:—120 feet long, 30 feet wide, 9 feet wide, burden, 450 tuns. She will draw about 6 feet of water.

In this city, on the 6th inst., there was launched from the yard of John Englis, a steam ferry boat, *N. S. de Regla*, designed to ply between Havana and Regla. She was built for the house of P. V. King & Co., this city. She is 141 feet long, 28 feet beam, 11 feet hold, and of 400 tuns. Her engines are to be put in by the Morgan Iron Works, and she will be completed by the middle of June.

At Jersey City, 6th inst., the tug-propeller, *J. H. Gautier*, was launched from the yard of the Messrs. Snellgrove. This boat cost $5,500, and will be used for harbor towing.

Our California citizens are making a good beginning in the boat building line. At San Francisco, March 9th, was launched from yard of J. C. Cousins, North Point, the *Neveda*, the largest high-pressure steamer yet built in California. She is 230 feet on deck, and 220 feet keel, 36 feet beam, with 10 feet 4½ inches depth of hold; a two-decker in the regular Mississippi style. She has some pretensions to model, being a regular clipper. She is calculated at 1,000 tuns burden, is expected to draw 3¾ feet light, and 5 feet water when laden, and her builders and owners will be considerably disappointed if she does not prove the fastest boat in the State. Her hull and decks are built of Puget Sound pine; her joiner work of Port Oxford cedar. She is to be driven by two side lever engines, 8 feet stroke and 24-inch cylinders, built in Cincinnati, Ohio. Her boilers, four in number, are set on the forward main deck, the engines in the rear. On the after part of the same deck the ladies' cabin is located, which is to contain eight bridal rooms. The upper deck, with an entrance close to the forward gangways, is occupied by a large cabin, running, with the usual offices for the business of the boat, the entire length aft. This cabin has 20 state-rooms on each side, each with two berths, running thwartships and is to be finished in the highest style of art. The entire cost of the *Neveda* will probably reach $100,000.

The Hoosic Tunnel.—The great bore through the Green Mountains, near Pittsfield, Mass., has proceeded very slowly for two years. At the west end the difficulty of tunneling has been much greater than was anticipated. Sometimes the labor of a month has been lost in a few minutes, by the loose material filling up the entire area. It became necessary to abandon the ordinary methods of tunneling and adopt new expedients; but until after the passage of the act of last winter, the contractors were unable to encounter the expense involved in a change of plan, as a vast amount of preparatory labor would be required, for which no payment could be made. The plan now adopted consists in removing the whole mass of material above the tunnel, some eighty feet in depth, supporting the sides with heavy timbers, then building an arch and filling over it with the material from the next section of tunnel. The work of arching was to have been commenced last week.

To Discover Bad Silver Coins.—When coins, or other surfaces of silver, are moistened with a little chromic acid—or what is just as well, chromate of potash and sulphuric acid mingled—a spot of reddish-purple hue soon appears. The tint is due to the formation of bichromate of silver. Of course, to insure the appearance of this color, silver must be present. Hence, base coins will not yield it—nay, more, very poor silver coins will not develop the appearance.

In Christy & Constant's paper establishment, Twenty-third street, New York, there is one machine which prints twelve colors on paper.

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Correspondence

Winan's Powder for Steam Boilers.

MESSRS. EDITORS :—The Polytechnic Report, published on page 266 of SCIENTIFIC AMERICAN, of my Powder acting on the oxyde of the iron, is calculated to do me much harm, as the impression will be injury to the boiler, which, however, is not the case, as five years' use fully proves. George Shield, Cincinnati Water Works, says :—"The plates carry their charcoal appearance when washed out, the same as new." W. & E. T. Fitch, New Haven, Conn., replaced their cylinder boilers with a tubular one, as it was found to *prevent*, as well as remove the scale. Shoenenberger & Co., Pittsburgh ; P. Hayden, Columbus, Gaylord & Co., Portsmouth and Cincinnati ; also, Mitchell & Ramnelsberg, Phillips & Son, Alex. Swift and others, in Cincinnati, Hamilton, Chicago, St. Louis and the West, will testify to its efficiency and and non-injurious action. H. N. WINANS,

Box No. 6, New York Post Office.

Complimentary Letters from Inventors.

It is always gratifying to us to receive letters of encomium from our friends for whom we have acted as attorneys in soliciting their patents, and we take equal pleasure in presenting them to our readers—not so much from a feeling of pride, as to evince to those for whom we are conducting patent business that, in their selection of our agency for managing their cases, they have made the very best choice.

The annexed letters have been received since our last issue:—

MESSRS. MUNN & Co.:—Indisposition has prevented me from expressing my thanks for your wonderful agency in conducting my application for a patent through the Patent Office so successfully. I received my Letters Patent much sooner than I expected. I also thank you for the very favorable notice of my invention in your excellent journal.

Very respectfully, T. D. INGERSOLL.

Grand Rapids, Mich., April 6, 1861.

MESSRS. MUNN & Co.:—We received your favor dated March 29th in due time, with cheering intelligence which we realized in full by the reception of our Letters Patent on the 4th inst. We were happily disappointed, for which we are truly thankful.

We intend to make application for another article to be patented, but shall wait a little while for the political horizon to clear away, when we shall certainly give you an other call. Yours, truly LUTHER HOLDEN.

Woburn, Mass., April 8, 1861.

MESSRS. MUNN & Co.:—The papers for the Reel were received in Brookline on Saturday. Please excuse an earlier acknowledgment, as the war fever excluded for a time almost every other thought.

Allow me to repeat, in behalf of the patentee, what we have heretofore expressed—a perfect satisfaction with your business management. Respectfully yours,

GEO. A. CARNES.

New York, April 17, 1861.

MESSRS. MUNN & Co.:—Your kind letter of the 15th was duly received, and I feel at a loss for words to express my abundance of gratitude to you for your prompt attention, perseverance and success in obtaining a patent right for my Gas Burner, which you have done without any trouble on my part. I will simply beg you to accept my warmest thanks, and be assured that I shall, in every possible instance, advise inventors to employ you as I have done. This I feel my duty, not only to you, but to inventors in general ; as by so doing they will not only save expense, time and trouble, but will secure to themselves that justice they would be apt to sacrifice in preparing their own papers and applying direct to the Patent Office department.

Yours, most respectfully, JOHN DANKS.

Troy, N. Y., April 20, 1861.

MESSRS. MUNN & Co.:—Your favor of the 1st inst. was duly received, and acknowledged by our clerk in our absence from the city. The intelligence of your success in prosecuting our claims at the Patent Office was highly gratifying to us. For the energy and tact you have always displayed in prosecuting our business at that Office, we desire to thank you, and shall always take pleasure in recommending your agency when occasion offers, feeling we can do so with the confidence that all persons employing you will receive prompt, proper and (what we have not always met with among patent agents) honorable treatment.

Trusting you will always meet with that success your manner of doing business deserves, we remain, very respectfully yours, S. H. & M. C. WALKER.

Boston, Mass., April 18, 1861.

MESSRS. MUNN & Co.:—The Letters Patent for my improved Tubular Augur is at hand. I tender you, as my attorneys, my sincere thanks. I am satisfied with your professional skill in the drawings and in the claims. I am the more grateful to you because you have secured to me a practical improvement which I have gained in the use and ownership of both Wyckoff's and Stevens' patents for Wisconsin. It is an improvement upon a $32,000 patent.* By your skill and fidelity it is secured to me for seventeen years for the whole United States.

The cash value which a government patent guarantees in its ownership is a good encouragement for capitalists to invest in that kind of property, rather than in State, bank or railroad stocks. The protection or monopoly which government secures to every owner of a good patent is equal to that of capital over labor or its equivalents. All of the latest and best improvements of the day are now made to pass through the crucible of the Patent Office, and any that will stand the fiery ordeal comes out pure gold.

Yours, with gratitude and kind regards,

S. P. GILBERT.

Racine, Wis., April 17, 1861.

* This is the amount Wyckoff pays Stevens for his patent, we presume.—EDS.

Philadelphia and New York Water Works.

On this subject, the Philadelphia *Ledger* says :—The water works of Philadelphia now supply about 65,000 water renters, at $2.50 each and upwards, according to the number of openings in the pipes. The entire receipts into the department for water and pipe amount to about $550,000 annually, giving a net income to the city of nearly $200,000. In New York there are but 50,000 water takers, and they have to pay, exclusive of water pipe, which is paid for out of a loan, $750,000 annually, the rents being $10 and upwards. With this large revenue, there is every year a large deficiency. Though the works of Philadelphia are very complete, the rapid spread of the city, and the continual erection of new buildings in the outer wards, have tested their capacity to the utmost in warm weather to supply the increased demand. Councils, in examining into the subject, concluded to enlarge the works at Fairmount by the erection of a new millhouse of sufficient capacity to contain three of the largest sized turbine wheels, by which the power at Fairmount would be doubled, and for years prevent any scarcity in the supply of water. The work was commenced, and the foundations for the buildings completed ; but in doing this the appropriation made for the work was exhausted, and now Councils are asked to pass a loan bill of over $40,000 to finish the job.

CURIOUS FACTS IN NATURAL HISTORY.—About thirty years ago (says a writer in the *Democratic Union*) the first crow crossed the Genesee river westwardly, and the fox, the hen hawk, swallow, and many other birds and insects, seem to follow civilization. Within thirty-six years the locust-borer made its first appearance in the United States, and as yet has not reached the locust trees of the South and West. It commenced its ravages on the east side of the Genesee river in 1830, and it was seven years before it crossed to the west side. The grain weevil began its course in 1828, and it progresses in the course it takes from ten to fifteen miles a year. Rose bugs have been so common in some of the Eastern States that on their seashores they have floated in windrows on the sands, having been driven into the sea by winds and drowned. The cedar or cherry birds were first noticed west of the Genesee river in 1828, and they are now so great a pest as to induce many to give up the cultivation of cherries. The curculio, which is indigenous to America, was first discovered by Mr. Gaul, the first editor of the *Genesee Farmer*, since which time it has disseminated itself over the whole country. The cutworm appeared in 1816 and 1821 (noticed as the cold years, when the whole northern country approached the brink of famine), and are now universal. The Hessian fly was introduced, it is supposed, by the foreign mercenaries in 1777, on Long Island, from their baggage or in the forage of their horses.

TO PURIFY IMPURE ALCOHOL LIQUORS.—This may be accomplished by dissolving a little soap in the spirits, and submitting the whole to distillation at a temperature not exceeding 212°. Not only is the spirit purified by this treatment, but it is strengthened, inasmuch as a portion of the water originally combined with it remains in union with the soap. And when all the spirit has come over, if a still higher degree of heat be applied, all the impurities separate, leaving the soap pure, and fit to be used again for a similar purpose.

MONEY FOR WAR PURPOSES.—The authorities of the city of New York have appropriated $1,250,000 for purposes connected with the war. All over the North, cities and towns are pouring out the money and men with astonishing vigor.

DESTRUCTIVE INSECTS.—Insects are troublesome, and sometimes very destructive. Plaster-of-paris, snuff, ashes or soot sifted on cucumbers and squashes when wet with dew, is very useful against the striped bug. Lime, road dust, ashes or snuff, scattered over young cabbages or turnips, will sometimes prevent the ravages of the black fly. Rolling the ground after sowing answers a good purpose, but the best preventive is a thorough sprinkling of the plants just at night with whale oil soap suds, in proportion of one pint of soap to seven and a half gallons of water. This will kill cabbage lice and all other aphides. It is sure death to all tender insects when forcibly applied with a garden syringe or rubbed on with a brush. For the want of whale oil soap, strong soap suds may be used. Salt is sometimes sown in the drills with onion seed to drive away the grub. Fine salt strewn broadcast over cabbage is the best application we know of for destroying the little green cabbage worm. Ducks, chickens and toads destroy a host of insects when suffered to inhabit the garden.

CRAYONS OR DRAWING CHALKS.—The civilizing influence of art is constantly improving the taste of the people. Color, pattern and design must now pervade all our manufactures to keep pace with the improved judgment of purchasers as to true beauty. Nothing tends to advance art more than making drawing one of the common branches of education, and few materials will render drawing more popular than the colored chalks or crayons as made by Messrs. Joel, of Paris, which are prepared thus. Take three-quarters of a pound of blue clay, three-quarters of a pound of the coloring required, such as vermilion, chrome, Prussian blue, orpiment, &c., two ounces of turpentine, four ounces of spirits of wine, and six ounces of fine shellac. The clay must be well mixed with water, passed through a fine lawn sieve, and allowed to subside ; the water is then poured off and the clay dried. The shellac must be dissolved in the mixed turpentine and spirit with a little warmth. The dried clay and the coloring must be now well blended in a mortar, and then the shellac mixture added and well incorporated till the whole is a doughy mass ; it is then to be rolled out into a pencil form and dried with stove heat. To make the crayons of uniform substance, the paste may be placed into a cylinder, with a hole at one end and a piston at the other (like a boy's pop-gun), the "wormy" pieces that pass through are then cut into proper lengths and dried.—*Septimus Piesse.*

MAKING STEEL TYRES.—The process of manufacturing the tyres without a weld consists, in the main, in drilling a hole near each end of a bar of cast steel, and cutting a groove through the solid metal, from one hole to the other. Wedges are then driven into the groove to open it out, when it is placed upon a draw bench and pulled out still more, until it assumes a sufficiently open form to be placed between two anvils, when a bolt is passed from the one to the other, and upon this the inner diameter of the future tyre rests. Instantly a heavy steam hammer, having a top swage the reverse of the flange and coning intended to be given to the tyre, is set in motion and continued (with a sufficient number of heats) until the tyre is formed and nearly perfected. The finishing operation is effected by rolling, after the manner of rolling tyre bars, except that the rollers work overneck or beyond the bearings instead of between them. The enormous amount of hammering and rolling applied to the manufacturing of these tyres, is not entirely absorbed in their mere formation, inasmuch as it is necessary for the solidification and homogeneousness of the metal, which is vastly improved by these operations.

THE FOREIGN POPULATION AROUSED.—The resident foreign population of this city has shown a most wonderful alacrity in the cause of the country. As an illustration of this spirit, we may mention that the Sixty-ninth Regiment, composed entirely of Irish citizens, under the command of Colonel Corcoran, was offered during one day seven thousand recruits. This regiment has gone to Washington. British, French, German, Polish and Italian regiments are also forming, composed in many instances of those who have seen service in the battle field.

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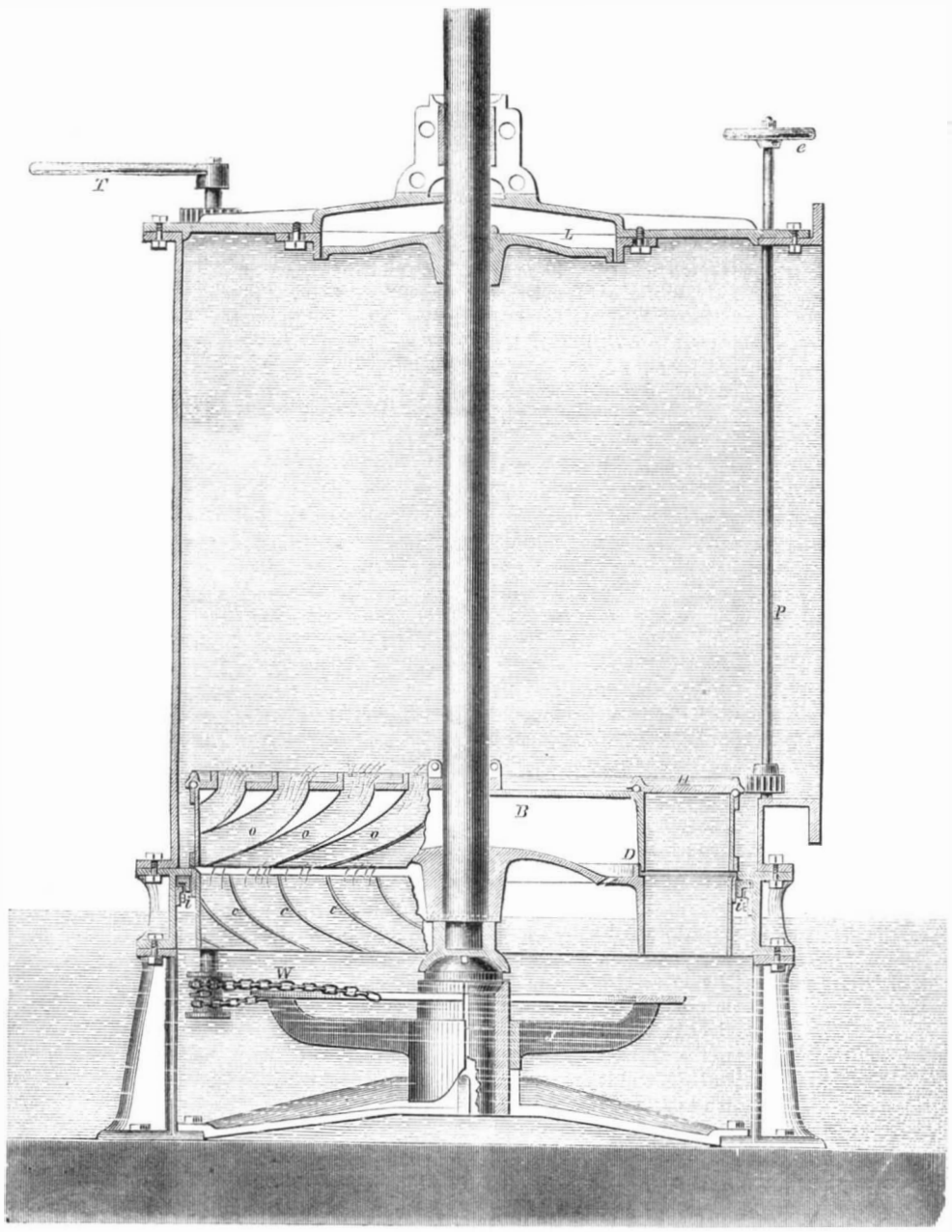
Improved Jonval Turbine Water Wheel.

On page 273 of our last volume, we gave an illustration of this wheel; but the drawings having been made from a model, did not represent the wheel as now constructed, and we now publish another engraving in which the parts are all shown in their correct working proportions. Mr. Collins' improvements were intended mainly to take the weight of the water and machinery from the step, to guard against the consequences of lateral wear, and to cause the wheel to give out as nearly as possible the same amount of effect whether more or less water is used.

The same letters are used to indicate like parts in the present engraving that were employed in the previous one. I is a regulator plate placed beneath the wheel and fitted around the hub which holds the step. The hollow hub of this step rests on strong cast iron pieces cast on the bottom of the hollow hub, to enable the plate to be raised and lowered by means of the handle, T, the shaft, P, and the chain, *w*. The loose packing ring, *i i*, is made to guard against the consequences of lateral wear on the step; *c c* are the buckets, and *o o* are the guides. H is a register gate placed above the guides to enable the operator to use any portion of water on the wheel or to shut it off altogether, as may be desirable. This gate is opened and closed by means of the shaft, P, and hand wheel, *e*. D is a gland point by which the water is excluded from the space, B, thus preventing a useless pressure of the water on the wheel plate, *a*. L is a lighter plate, firmly keyed on the shaft, and running in a loose packing ring. On the lower side of this plate the water in the wheel case presses with whatever force is due to the head above this point, so that by graduating the area of this plate to the weight of the wheel, shaft, water, &c., the step is relieved from any injurious pressure in a most simple and cheap manner.



COLLINS' IMPROVED TURBINE WATER WHEEL.

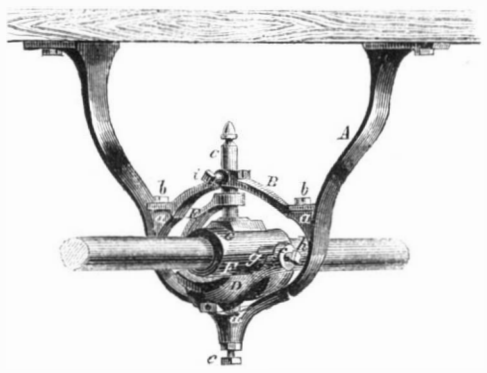
The inventor says that a large number of careful experiments have shown that there is hardly any variation in the percentage of power yielded by this wheel with varying quantities of water, from a full supply down to a reduction of 40 per cent. The diminution of friction, and the convenience with which the supply of water can be regulated, are plainly to be seen by the construction.

J. P. Collins is the inventor of this wheel, and it is manufactured by Collins, Haydock & Wildman, of Troy, N. Y., of whom further information may be had.

To Prevent Rot in Dwelling Houses.—Make two or more openings in the external walls, and put gratings on them to keep out vermin from below the basement floor. Insert a tile pipe into the fire wall, with one end open to the space below the floor, and carry the pipe up the center of the fire wall as close as possible to the fireplace and out at the chimney head. The air in the pipe will be rarefied, being in close contact with the fire flue, thus causing a continuous upward flow, sweeping the space below the floor of all foul air, which, in my opinion, is the chief cause of dry rot. The whole of the apartments in the house may be ventilated by means of this pipe, by inserting a tube into it at the level of the ceiling, with a valve in it to prevent down draught. I have adopted this system for the last ten years, because I know of no better.—*London Builder.*

Improved Oscillating Hanger.

The accompanying engraving illustrates an improved hanger, invented by James P. Collins, of Troy, N. Y., which he says is giving the most perfect satisfaction to all who have used it. The object of this invention is to obtain a bearing of simple construction which will have a universal adjusting movement, and at the same time be properly supported at all points



COLLINS' OSCILLATING HANGER.

so as to admit belts being applied to the shafting in any direction.

In the cut, A represents a cast iron pendent frame secured in the usual manner to the flooring beams or ceiling of the building where the shafting is to be hung. At the inner side of frame, A, at two opposite points, there are shoulders, *a a*, which form supports for a curved plate, B, the latter being secured on the shoulders by belts, *b*. Through the center of the plate, B, an arbor or rod, C, passes vertically, and through the cencer of the bottom of the frame, A, a screw, *e*, is inserted in the same vertical line, the latter serving as a support for the arbor, *d*, of a cup or shell, D, which is placed within the frame, A.

The cup or shell, D, may be of cast iron of oblong form, the arbor, *d*, projecting downward from the center of the bottom of the cup or shell and fitting within a recess, at the bottom of the frame, A; the screw, *c*, extending up within said recess. At one side of the cup or shell, D, there is a curved arm, E, which extends over the top of the cup or shell a trifle beyond its center, and through which the rod, C, passes. The rod, C, it will be seen, and the arbor, *d*, form the axis of the cup or shell, D, the latter being allowed to turn horizontally on this axis. On the cup or shell, D, there are two bearings, *f f*. These bearings are placed at opposite sides of the cup or shell, and receive the trunnions, *g g*, of a box or bearing, F; the trunnions being allowed to work freely in the bearings, *f f*. Through each side of the cup or shell a screw, *h*, passes, and these screws form stops for the ends of the trunnions, *g*, and admit of a lateral adjustment of the latter in the bearings, *f f*.

G is the cap or top of the bar or bearing, F, on which the end of the rod, C, bears, the upper part of the top, G, being rounded so as to form a segment of a cylinder, the trunnion, *g*, being at the center thereof. Into the upper part of the plate, B, a screw, *i*, passes to secure the rod, C, at any desired point. It will thus be seen that the box or bearing, F, has a universal adjusting movement, and that it may be made readily to conform to the line of the shafting; the cup or shell, D, which catches the waste lubricating material admitting of a horizontal turning movement, and the screw, *c*, effecting a vertical adjusting movement of the box or bearing in a vertical plane. At the same time, it will be seen that the box or bearing, F, is supported at all sides; the rod, C, serving as an upper stay, and the screws, *h h*, as lateral ones. Belts, therefore, may be run from the shafting in any direction, and the latter be perfectly supported.

In picker or carding rooms, where dust accumulates rapidly in the dripping pans, the dripper may be detached from the central frame and suspended below the hanger in such manner that it may be easily removed to be cleaned.

The patent for this invention was granted (through the Scientific American Patent Agency), October 2, 1860, and for the purchase of rights, or for any further information, address Collins, Haydock and Wildman, Troy, N. Y.

Colors Most Frequently Hit During War.—It would appear, from numerous observations made by military writers, that soldiers are hit during battle according to the color of their dress, in the following order:—Red, the most fatal color; the least fatal, Austrian Gray. The proportions are: Red, 12; rifle green, 7; brown, 6; Austrian bluish gray, 5.

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VOL. IV. NO 19.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, MAY 11, 1861.

THE REASON FOR SECESSION.

Some of our friends abroad are amazingly puzzled to know the cause of this revolution now upon us. A few words will serve to show how the matter stands. When the sun arose on the 6th of November last, it shone upon 33 States in union, containing a population of 30,000,000, the most happy and prosperous people on the face of the earth. According to constitutional requirements, the people of every State (save one) came together, and cast their votes for a Chief Magistrate. The result showed that Abraham Lincoln was legally chosen President for four years. No one disputed the legality of his election; but thousands in this city and elsewhere regretted it. The people of this city voted against him strong. This we had a right to do; but not one of our respectable citizens regarded his election as a just cause of revolution. Even Mr. Stephens, now Vice-President of the Confederate States, declared that it was no good cause. South Carolina thought she had a cause, and speedily, without waiting for any overt act—indeed, long before the inauguration of Mr. Lincoln took place—met in convention, and voted herself out of the Union. Public confidence began to be disturbed, and a speedy downfall of business followed. The other cotton States tied themselves to the tail of South Carolina, and acts of seizure and violence of the most disgraceful character were sanctioned by the State authorities; and even our Federal government allowed itself to be driven out of Charleston harbor by the booming of its own cannon in the hands of the State authorities. The insult was borne with patience—insult was added to injury—until "forbearance ceased to be a virtue." The South having lost an election which they went into, and imagining some great wrong, commenced to defy the government which had never injured them in the slightest degree, when, lo and behold, civil war is upon us! because we refuse longer to be kicked and cuffed about by them, and are not willing to give up all our forts, and even the Federal Capital itself, from which they seceded. Jefferson Davis, who has been plotting the overthrow of the government for years, would be perfectly satisfied if we would give up everything, and submit to the degradation of allowing the President of the United States to set up his government on a drum-head. The North cannot, and will not, submit to this; and those who have done most, and worked hardest for the South, are first and foremost in arming for the war. In the Sixth Ward, of this city, where Jefferson Davis has had thousands of friends, a powerful regiment isformed, and now, while we write, are on their way to resist his further encroachments upon the rights of the North. We are no politicians, and have never said or done aught against our Southern brethren. We wish them no harm, and we kindly ask them to pause and think the matter over cooly and calmly, without passion and without prejudice. We war not against them for the sake of blood; but we war against them for the maintenance of the best government that ever existed—for the time-honored flag of our country—a flag that was loved by Washington, Madison, Jackson, Clay, Webster, and every other true patriot in the land, as the "gorgeous ensign of the Republic."

The entire North is aroused, and should it cost her a hundred thousand human lives, and a hundred millions of dollars, the government will be sustained.

OUR HISTORY OF THE WAR.

In the midst of the great struggle that is now going on for the overthrow or the permanent establishment of our government, we intend to devote a sufficient space in our paper to a record of the events of the war. In doing this, we shall avoid the flying rumors necessarily published in daily papers ambitious to give the latest news, and shall endeavor to sift out from the conflicting reports only those statements which are fully authenticated, so as to give our readers a full and accurate history of the war as it progresses.

We shall not, however, present a mere dry collection of events and dates, but shall also describe the opposite feelings and opinions of the millions that are hurling themselves against each other. It is only in the light of these feelings that the military operations can be understood, for there never was a war more likely to be influenced by reference to political combinations than the one in which we are now engaged. In the extreme South are seven States in which there seems to be a great preponderance of feeling in favor of overthrowing the government and breaking up the country; in the North are nineteen States unanimously determined to make every sacrifice and to put forth every exertion necessary to sustain the government and preserve the integrity of the nation; while between these two decided sections are eight States in which the people are divided in sentiment, generally loving the country, and anxious to preserve it in undiminished strength, though they seem to be strangely slow in coming to its defence in this hour of peril.

The struggle will doubtless be one of the most gigantic and terrific that the world has ever seen. Both sides are amply provided with implements of destruction, they are each composed of millions of brave men, and they are bent upon their opposite purposes with the deepest and most determined earnestness. The great drama is already commenced, and its thrilling scenes, with their noble self-sacrifice, sublime daring, heroic achievements and grim horrors, are passing in swift succession before us.

PURIFYING WATER FOR SOLDIERS.

During warm weather, soldiers in camp, and upon march, frequently can obtain no other water to slake their thirst and cook their food, than that of ponds, rivers and brooks. These waters are frequently charged with organic matter, which is liable to produce dysentry, and, in many instances, cholera. Soldiers should therefore become intelligent, so as to provide for every contingency in war. The preservation of their health should just be as carefully guarded to insure efficiency, as good discipline and a supply of ammunition. A few words upon impure water may therefore be of great advantage to many of them, and possibly may be the means of saving many lives.

The organic impurities of water are partly of animal and partly of vegetable origin, both of which are very objectionable, but the animal most of all. These impurities are constantly undergoing chemical changes—a fermenting process—and it is during such a state of change that the water is dangerous; because when taken into the human system in this condition, it tends to engender the same fermenting action. The nature of this action is not well known, but of the fact there can be no doubt. Rapid running streams, even if they are as brown with mud as the Mississippi river, and as much charged with organic matter, are perfectly healthy, because no chemical change—no fermentation—takes place in them. Sluggish streams and stagnant pools are the most to be dreaded. The mud may be filtered from the water of a running river by merely passing it through cotton cloth, a piece of a blanket, or flannel shirt, and we would advise soldiers to do so in most instances. This simple method of straining water will also be found a partial safeguard for stagnant water, but not a perfect one. When on march, soldiers should endeavor to endure thirst with fortitude; and when they rest for cooking their food, they should boil the water which they intend to carry with them for drinking. When cooled and agitated in the air for a few moments so as to absorb oxygen, it becomes quite pleasant to drink. The natives of the East Indies who live in flat alluvial districts, where the ponds and rivers are sluggish and charged with organic substances, boil the water for drinking, and allow it to stand over night. This process they say prevents them from taking cholera. The reason is evident to a man of science; the high heat of boiling destroys the fermenting action. Let soldiers therefore be careful to boil and filter the impure water which they, of necessity, are frequently compelled to use.

ATTITUDE OF MARYLAND.

The position assumed by some of the people of this State is most humiliating and extraordinary. The seat of the government of the United States is on the borders of Maryland, and there is no access to it except across its soil. Our right to reach the Capital, and defend it from threatened attack, could only be disputed, it seems to us, by a horde of unlettered savages. Upon the evacuation of Fort Sumter, the Secretary of War of the Confederate States threatened to carry the secession flag to the national capital. Acting on this hint, the government called for troops to protect and defend the capital. The threat to seize it had been made time and again on the part of the secessionists, indeed counting upon the inactivity or intervention of their friends here, the meditated attack had become a pet scheme with them. This, perhaps, more than anything else, began the important work of uniting and consolidating the strength and opinions of all parties at the North. Forgetting all past differences on political issues, the determination that our government should not be hunted and driven from the seat of its power, became fixed and unaltered in the Northern mind. The maintenance of the government itself became a question of life or death.

Troops passing through the great city of Baltimore, in response to the call of the Chief Magistrate, were set upon by a violent mob, and several were killed. A more wanton and diabolical act was never committed; and yet we find the authorities and leading citizens of that hitherto prosperous and peaceful State interceding with the President not to move any more troops across their borders. In other words, the government of the United States is cooly requested to keep quiet, and allow the city to be set upon and taken by the secessionists, and the officers of the government, and all the public archives, placed completely at their mercy. Not a word of complaint is uttered against those who threaten all the evil, but invasion of the South is the cry. Does it seem possible that a more degrading spectacle than this could be exhibited on earth? The pages of history may be searched in vain for anything like a parallel. There are noble men in Baltimore, whose loyalty to the government is unquestioned. The city abounds with them; but they have been awed down by a mob, incited to action by a venal press. Maryland now becomes the scene of action, and by the rash acts of the enemies of its peace and prosperity, must feel the first shock of war that now presses upon her soil, and, if need be, the story of Baltimore may be written over her ashes. This may become a terrible necessity. Better that a dozen of our largest cities should be destroyed, than that the Federal capital be seized and sacked by rebels, and the officers of the government placed at their mercy.

Extraordinary Cannon Shooting — A New Projectile.

We invite the attention of artillerists and military engineers to the engravings, on another page, of the targets made with Hotchkiss' improved shot. Considering the weight of the gun and the weight of the shot, it is the best practice that we have yet seen any account of. The Armstrong gun was found, in the China war, to be so destructive to the English forces from the leaden bands flying obliquely from the shot, that it was necessary to withdraw it from action. The practice with the James gun at Watch Hill showed that his shot was still more objectionable from this same cause. The iron cap at the rear of Hotchkiss' shot operates to hold the leaden band, and prevent it from being torn or thrown off. As the flying off of a portion of the band on one side of the shot causes the latter to deviate from its initial course, and as the targets show that no such deviation took place, the device must effectually accomplish its purpose. In the interest of the service and of the country, we respectfully ask of our military authorities an examination of this shot.

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LEARNING TO SHOOT.

At West Point, the cadets are daily trained to shoot at a target with the musket-rifle. They fire ten shots, in squads of ten, at as many iron targets, the size and form of a man. Each squad is arranged in line, so that each cadet fires at his own target, which has its number painted upon it. The shooting of each cadet, and each squad, is recorded, so that the qualities of each, as a marksman, are well known to the instructor.

While on a visit to this famous military school last summer, we paid particular attention to the rifle shooting of the cadets. It was what may be called in general, *loose firing;* yet we could not fail to notice how some of the cadets appeared to be born marksmen, while others appeared to be naturally incapable of learning the art.

One cadet, whom we watched, tried in vain to hit his target at a very moderate distance from it; not believing the fault was in himself, he complained that it must be in the rifle. He was very soon convinced of his error by the instructor taking up his rifle and planting the bullet right in the "bull's eye." We made some inquiries of the instructor respecting the qualities of the cadets in learning to shoot, when he told us that the youth to whom we have just referred, could not be made a marksman.

Chapman, in his book called the "American Rifle," states that all men dodge in firing—some before, and others just after the shot is fired. The latter class may learn to be marksmen, the former never. In learning to shoot with a rifle, a person should strive to acquire a steady cool demeanor, with a true quick eye, and nimble finger. Practice, and nothing but practice, can make a good marksman. At the same time mere firing is not the only practice necessary.

CAREFUL LOADING OF RIFLES.

The use of the conical bullet in rifles is a great improvement over the old spherical bullet. Its form offers less resistance to the atmosphere in passing through it, and a heavier bullet can be employed, thus greatly increasing the range or distance which it carries. But the conical bullet is not more accurate for short ranges than the round ball; indeed it is not so accurate, unless the rifle is loaded with great care. A conical bullet must enter the barrel perfectly true, otherwise, when discharged, it will be liable to fly off to the one side.

Those American rifles which are employed for prize shooting are of two classes—one having Clark's false muzzle, the other Fish's turned and countersunk muzzle. The false muzzle is a short loose section of the rifle barrel which fits on the barrel with pins for loading, so as to give the bullet a very snug and accurate entrance, then it is taken off when the rifle is to be fired.

Unless the muzzle of the barrel is perfectly true—if it has the slightest defect in the grooves or lands—the bullet will not carry straight. Soldiers and others who have rifles, should be as careful of their muzzles as their watches.

The countersunk muzzle protects the end of the barrel, which is also turned down for about an inch-and-a-half on the outside. This is for the purpose of receiving a *loader*, which consists of a small flask into which the bullet is inserted to give it an accurate entrance into the bore.

COST OF ARTILLERY.—The cost of the Dahlgren's great 9-inch iron guns is 6½ cents per pound. As they weigh 9,000 lbs. each, the cost of a gun is $646. The 8-inch columbiads weigh 8,500 lbs.; the 10-inch, 16,000 lbs. each: both are sold at 6½ cents a pound. Forty-two pounders weigh 8,000 lbs.; 32-pounders, 3,300 lbs. to 5,600 lbs. each. The 12-pougders are sold at 5 cents—the others at 6 cents a pound. Seacoast howitzers of 3 and 10-inch bore weigh from 8,500 to 9,500 lbs. each, and are sold at 6½ cents a pound. Siege howitzers of 8-inch bore are much lighter, weighing from 2,500 to 3,000 lbs., and are sold at the same rate as those above mentioned. Brass guns are much lighter, the army pattern 12-pounders weighing only 4,300 lbs.; they are, however, sold at 46 cents a pound. The Dahlgren brass guns are still proportionately higher priced; the 12-pound patent mountain howitzers, weighing 220 lbs., are sold at 75 cents a pound. Shell sell, according to weight, at from 4 to 6 cents a pound; shot, at from 3½ to 4 cents.

Burning of the Arsenal at Harper's Ferry.

HARRISBURG, PA., April 19, 1861.

Lieutenant Jones is now at the Carlisle Barracks.

He states that hearing yesterday that 500 Virginians were approaching by the Winchester road to seize the arsenal, they put piles of powder in straw in all the buildings, and waited quietly the approach of the picket guard, who gave the alarm, when the garrison set on fire the outhouses, carpenter shop and powder fuses, and then began to retreat.

The citizens of Harper's Ferry, who were evidently in league with the party advancing to seize the arsenal, were instantly in arms, pursued, fired, and killed two regulars. Two others deserted before the troops reached Hagerstown. They marched all night, missed the railroad at Hagerstown, and took omnibuses to Chambersburgh to-day. They are much exhausted by the night's march. They were fed by the people of Chambersburgh, and were received with loud cheers along the route to Carlisle.

Lieutenant Jones is a son of the late Adjutant Gen. Jones, of the United States Army. He says as the federal troops rushed across the Potomac bridge at Harper's Ferry, the people rushed into the arsenal. He believes that large numbers perished by the explosions. Repeated explosions occured, and he saw a light burning in the buildings for many miles.

Lieutenant Slemmer and Fort Pickens.

The names of Major Anderson and Fort Sumter have become as familiar as household words; not much less so are the names of Lieutenant Slemmer and Fort Pickens. A recent letter from one of the officers of the war steamer *Wyandotte*, now lying off that fortress, says:—

Fort Pickens is a very strong bastioned fort, and very advantageously situated. The garrison can repulse seventy times their numbers. Lieutenant Slemmer is one of the kind of men that would wrap himself in the American flag, and, if necessary, blow the whole thing to atoms. He does not look like a very extraordinary man, he is so small and insignificant looking; but when he says he will do a thing, you may bet your "entire pile" he will. I never saw a man in my life that could equal him in coolness. Amidst all the excitement, he is as unconcerned looking as if he had nothing to worry him in the world.

The Allegheny Arsenal.

The Allegheny Arsenal, in Pennsylvania, has now on hand the following pieces of ordnance:—24 42-pounders, 47 32-pounders, 32 24-pounders, 44 10-inch columbiads, 63 8-inch columbiads, 22 24-pound flank defense iron howitzers, 3 12-pound brass field-pieces and 2 24-pounder brass howitzers.

It has also 40,541 rifles and muskets, and large quantities of ammunition. The armory is in a state of activity, the workshops now employing over 200 men, capable of turning out 300 horse sets and 5,000 accoutrements monthly. Sixty muskets can be rifled daily, and the muskets of 1812 are to be rifled forthwith. Orders for accoutrements are being received, and an additional force will probably be employed as soon as possible, being now daily increasing.

American Inventions.

At a recent meeting of the London Society of Arts, a paper was read by C. W. Eddy, formerly Traveling Fellow of the University of Oxford, giving an account of "American Implements and Economical Contrivances."

The author began by saying that he thought the observing traveler in America could not fail to be struck with astonishment at the vast amount of work that had been achieved; of forests cleared, of land reclaimed; of roads, railroads and canals constructed, and of cities built by a sparse and scattered population, in the brief period of time which had elapsed since the first peopling of the country. In considering these wonderful results he had been led to notice the ingenuity shown by the people in devising implements and machinery for economizing labor, which was so dear in many parts of that country, and some of which he thought well worthy the attention, and even of adoption in England. He would first touch upon agricultural implements. The first he noticed was the American felling ax, so well known in timber regions. Large quantities of these axes were made by the convicts in the State prisons, and sold at a slightly remunerative price. Next in order to the felling ax came the stump extractor, a compound lever of wood, strengthened with iron, 30 feet long, with a handle at each end, worked generally by a chain of iron. The author then spoke of a method of applying steam power for felling and cutting up trees; of a peculiar method of fencing; of an earth auger for boring holes for posts; of the mode of making plank roads; and described in detail the different kinds of stone-crushing machines, which worked very efficiently. A peculiar kind of carriage spring, able to beat the jerking of the roughest roads, was next noticed, and some modifications in the general construction of the American carts and wagons was described; also the endless railway horse-power; and for most of the stationary work on a farm—thrashing, winnowing, chaff and corn-stalk cutting, cutting up wood for fuel, &c. The subject of plows was discussed at some length, and the portable steam plow described. Various other inventions and appliances were alluded to, such as machine-made watches, wood-working machinery, floating docks, unloading gear for shipping, railway engines and carriages, tramways and tramway cars, steam ferry-boats, canal sluices, canal boats built in sections, steamboats and pilot boats, &c.; and, finally, modes of house-warming adapted for very cold climates.

Ordering Cannon from Europe.

Several of our daily papers are advising government to send to England a large order for rifled cannon. As, of all the cannon invented in England, the one considered the best, and adopted by the heads of the army and navy, is the Armstrong gun, we presume that is the weapon which would be purchased by our government. Now, the London *Mechanics' Magazine*, a paper of the highest character, states positively that, in the Chinese war, this weapon killed and wounded so many outlying English riflemen, by the leaden bands flying from the shot, that *it was necessary to withdraw the guns from action.*

Before sending orders abroad, let us know whether we cannot obtain what we want, of better quality and far more quickly, at home. There are hundreds of foundries, machine shops, and rifle manufactories in the country, owned and operated by ardent patriots, who are impatiently waiting for an opportunity to spring to their labors night and day, and show what the skill and power of the nation can do in arming and equipping its soldiers.

If proposals were invited for furnishing any pattern of cannon, rifle, or musket desired, we have no doubt that they would be supplied in any quantity sooner than they could be got from across the Atlantic.

Purifying Carbon Oils.

A patent has lately been taken out in England by James Stuart, of London, for the treatment of petroleum and crude oils of all descriptions obtained from coal, shale, bitumen or wells, such as those which have become so numerous in various parts of the country. The following is a condensed description of the invention, taken from the London *Journal of Gas Lighting*:—

For every 100 gallons of crude oil to be treated, 12½ lbs. of bichromate of potash is taken and dissolved in 12½ gallons of water, and to this solution is added 1¼ gallons of oil of vitriol (the sulphuric acid of commerce). The solution of chromic acid which is thus obtained is added to and mixed with the oil, the oil being kept intimately mixed by churning or agitating it for about an hour. By this treatment, a quantity of pitchy matters and other impurities are separated from the oil, and the oil is deprived of the greater part of its unpleasant smell. The chromic acid is at once converted into oxyd of chromium, with which the excess of sulphuric acid unites, and forms sulphate of chromium. The mixture is now left at rest until separation takes place, which is usually the case in from one to two hours. The oil then being the upper portion is drawn off into another vessel, agitated with a solution of soda for about an hour. This is done to wash out or neutralize any acids remaining in the oil. The solution of soda, which it is preferred to use, is made by dissolving 12½ lbs. of soda ash of commerce in 12½ gallons of water, and adding that quantity to every 100 gallons of oil to be washed. After one hour's agitation, the whole is left at rest until the oil has separated from the soda solution, after which the oil is placed in an iron still, and distilled. The distillation is continued until the whole bulk of oil distilled over reaches .840 sp. gr. at 60° of temperature. The distillate is to be then placed in a proper vessel, and treated as before by churning or agitating with a solution of chromic acid in water. For every 100 gallons of oil to be treated, 12½ lbs. of bicromate of potash is dissolved in 12½ gallons of water, and to the solution is added 1¼ gallons of oil of vitriol. The compound is mixed with the oil by agitation for about an hour, and then the whole is left at rest until the oil is separated from the solution of sulphate of chromium and impurities. Afterward, the oil is drawn off into another vessel, and washed by mixing or agitating it, for half an hour or thereabouts, with one-fourth its bulk of water, or one-fourth its bulk of lime-water. When the water or lime-water has completely separated, and the oil has become bright, it will be fit for use as an illuminating oil. The heavy oil remaining in the still is distilled to dryness, and

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may be then treated by any of the known methods for obtaining paraffine or lubricating oil. The chromic acid used in the process above described may be obtained otherwise than from the bichromate of potash; it is, however, usually most convenient to employ this salt. It is preferred to apply chromic acid in the first place, to the crude oils, becauee the solution of chromic acid, by removing the pitch, tar and other impurities from the oil, enables it to be distilled at a heat much lower than would otherwise be necessary, and so prevents decomposition taking place in the still. It is found that, after treating some crude oils with a solution of chromic acid, and distilling until the distillate or whole bulk of oil distilled over reaches 840° sp. gr., that the oil so obtained is of too dark a color to be used as an illuminating oil. In this case, the oil is treated by churning or agitating it with two per cent (by bulk) of oil of vitriol for about an hour, then allowing the whole to rest until the acid, tar or sludge is separated from the oil. The oil is then drawn off into another vessel, and agitated with two per cent of powdered quicklime or dried chalk for another hour, or until all the smell of sulphurous acid has left the oil. There is then added added 25 per cent (by bulk) of water, and the whole is agitated for a quarter of an hour; after which time, the mixture is left at rest until the oil has become bright, when it is drawn off for use; but if the oil is not of a good color, it is re-distilled. If there is any difficulty in getting the oil perfectly bright, there is added to every 100 gallons of oil, 26 lbs. of common salt dissolved in 8 gallons of water, and the whole is agitated well together for a quarter of an hour; then, when left at rest, the oil will become perfectly bright. In no case, however, is the oil of vitriol used for treating the oil, if it can be avoided, as it unites with and decomposes a great part of the lighter oils, and this it is wished to avoid as much as possible. The chromium used in the process may be recovered either as sulphate or oxyd, as desired.

NAVAL WARFARE.—The proposition of Jefferson Davis to issue letters of marque, with a view to stimulate privateering on the commerce of the North, has aroused the commercial men here to provide the most effective means possible to punish the pirates who engage in it. An immense number of gun-boats are in progress of being fitted up to coöperate with the blockading navy, and it is believed that no serious trouble will arise to our commerce from Mr. Davis' efforts to prey upon it.

California steamships will be provided hereafter with a powerful armament and can thus protect themselves in the most complete manner. Commodore Vanderbilt has nobly offered his fleet of ocean steamers to the government for war service, fully manned and equipped, free of charge. This is the biggest thing yet in a patriotic way.

NURSES FOR THE SOLDIERY.—A company of nurses left this city for Washington on the 29th, under the auspices of the Chamber of Commerce, and will go out by way of Baltimore. Miss E. M. Powell accompanies the expedition, and has letters to the authorities at Washington. Three of the company are experienced surgical nurses, and several others have studied and practiced medicine. The lint and bandage manufacture is going on with remarkable energy. Large quantities have already been prepared and packed ready for use.

SOUTHERN COAST.—It is thought here that the hardy regiments now actively mustering in Maine, New Hampshire and Vermont will be concentrated as soon as possible at the Navy Yard, Portsmouth, N. H., and shipped to some important point near Charleston, S. C. It is undeniable that, at the Navy Yards of Charlestown and Portsmouth, active preparations are making to send out a fleet, and, of course, it will not start till it is well manned.

PATRIOTIC.—Messrs. Hotchkiss & Sons, of Sharon, Conn., offered to Governor Buckingham the use of a large bronze rifled cannon, and all of their patent projectiles which may be required for it, during the war. The gun weighs 931 lbs., and carries a 16 lbs. ball. Governor Buckingham has accepted the gift. They have also offered to produce additional rifled cannon and projectiles at cost.

Safety of the Patent Office.

We have received a number of letters from persons desiring to apply for patents, inquiring if we are still transacting business with the Patent Office, and if a communication was open between New York and Washington. In answer to these inquiries, we would state that we are prepared to conduct applications before the Patent Office as usual, and that mail communication from this city to Washington, although obstructed for a few days, is now open, and that we transmit to and receive our mails from Washington nearly as regularly as ever. The great anxiety for the safety of our national capital, and, consequently, the Patent Office, which was felt for a few days, has nearly subsided in this city; and those of our inventors who have expressed so much concern for the safety of our Patent Office, and the contents of its valuable archives, may, we think, rest easy in the future for their safety. A regiment of soldiers is in constant guard at the Patent Office, who, with the fifteen thousand other soldiers under the command of Lieutenant General Winfield Scott, now located in Washington, will, we are confident, be sufficient, with the thousands more *en route* for that point, to protect the seat of government beyond any forces which can be brought to bear against it by the secessionists.

The Strength of the Regiments leaving this City for Washington.

Subjoined is a list of the regiments that have left this city, and passed through here, for Washington. The numbers are as reported by the adjutants of the several regiments.

Reg.	Where from.	No.	Date.
5th	Rhode Island	280	April 15
7th	New York	990	April 16
8th	Massachusetts	1,000	April 14
71st	New York	1,110	April 20
12th	New York	1,000	April 20
6th	New York	1,000	April 20
5th	Rhode Island	782	April 20
6th	Massachusetts	365	April 21
69th	New York	1,100	April 23
8th	New York	1,000	April 23
13th	Brooklyn	735	April 23
25th	Albany	700	April 24
7th	New York (recruits)	130	April 24
1st	Rhode Island	540	April 25
Total		16,330	

Inventions of War Wanted Immediately.

There is a demand for a simple, effective machine for cutting out bandages and making lint for army purposes.

A flexible india-rubber tube, fitted with a metallic mouthpiece, with some substance like sponge, or, what would be better, a composition of porous carbon, placed inside, at a point near the end, to be placed in water, would be very useful for soldiers in hot weather. The proposed composition would filter and purify the water, and a regiment of soldiers marching could slake their thirst with fresh water at every running brook, without the danger of swallowing tadpoles or lizzards.

Polytechnic Institute and Engineers' Association.

For the present, we shall discontinue our weekly reports of these meetings. In the excited state of our country, we think our readers will be more interested in a truthful summary of the war proceedings, and in illustrated descriptions of the most useful inventions pertaining thereto, than in the reports of scientific associations.

We mean to make the SCIENTIFIC AMERICAN a truthful medium for disseminating information in relation to the progress of our army, and, at the same time, impart useful information in regard to the inventions of our country. We would recommend all who take the paper to preserve the numbers for future reference.

THE mechanical engineering and inventive skill of the North will each play a most conspicuous part in the great war now in progress for the maintenance of a Constitutional Government. In these essential elements we are abundantly supplied, and can furnish all the enginery of war that can possibly be needed. The public and private armories are running day and night, while it is positively announced that the government have ordered 500,000 stand of arms from Great Britain, which are daily expected.

STRAW HATS FOR THE TROOPS.—The government has just purchased twenty thousand straw hats. These will be very acceptable to the troops quartered at Washington, and other points where the heat of the sun is almost unbearable without such protection.

RECENT AMERICAN INVENTIONS.

Steam Plow.—This invention relates to an improvement in that class of steam plows in which spades or shares are attached to the periphery of a rotating drum. The object of the invention is to insure a perfect action of the spades or shares upon or in the soil, so that the desired work may be done in an efficient manner, on whatever soil the machine operates. The invention also has for its object the ready elevating of the spade-cylinder above the surface of the ground, when it is desired to have said cylinder inoperative, and also the ready towing of the machine, and the clearing of earth or trash from the spade. John R. Smith, of Trenton, N. J., is the patentee of this device.

Square Pianos.—One reason of the superiority of the grand over the square pianoforte, as heretofore constructed, is owing to the former having the position of the bottom of its case below the strings and sound-board almost entirely open, or composed only of a series of bars, which permit a freedom of vibration of the strings not otherwise to be obtained. The great obstacle to the construction of the case of the square pianoforte, with an open or barred bottom of similar character, has been its contracted horizontal area, and the proportion of room occupied by the key-board and action, which, with the ordinary arrangement of the wrest-plank and other portions of the string-frame, has rendered it impracticable to have an opening below the strings, of such size as to be of any advantage. This invention consists in a certain relative arrangement of the wrest-plank and other portions of the string-frame, the sound-board, and open or merely barred portion of the bottom of the case of the square pianoforte, whereby that portion of the case is made to correspond in form and coincide in position with the scale or spring-frame or sound-board, and the same free vibration of the strings and sound-board obtained in the grand pianoforte is provided for. C. F. Chickering, of New York city, is the inventor.

Spinning Frames.—The object of this invention is to allow the twist to pass from the spindle to the first or back pair of drawing rollers during certain portions of every revolution of the front drawing rollers, in which their drawing action is suspended, and to perform the drawing during the remaining portions of the revolution, in which the twist is prevented passing the second or front rollers; and the invention consists in a certain construction of the lower front drawing rollers to effect the above object. The patentee of this invention is Frederick S. Stoddard, of New Haven, Conn.

Transmitting Motive Power.—This invention (patented by Thomas J. Lowry, of Conneautsville, Pa.) consists in the arrangement of a circular rotary track, in combination with an inclined stationary track, and with a car propelled by some motive power, such as a steam engine, horse-power, &c., in such a manner that, by the action of the rotating wheels of the car, a rotary motion is imparted to the circular track, and that the power produced by the steam engine or other motor is assisted by the weight of the machinery which constitutes said motor in its action on the circular track.

Steam Trap.—All the steam traps heretofore made, in which the expansion and contraction of the pipe serve to operate the valve or valves, are constructed with butt valves which are forced against their seats when the pipe expands, and which are removed from their seats as the pipe contracts. The use of such valves creates a serious difficulty, because the impurities which are carried through the pipes by the current of steam are liable to form a sediment on the valve or valve seat, so that it is impossible to close the valve tight, and the effect of the steam trap is spoiled. This difficulty is obviated by the use of a rotary valve which is operated by the expansion and contraction of the pipe carrying the condensed water from the steam heater. The motion of the valve is multiplied and its effect improved by the action of a two-armed lever, the long arm of which forms a toothed segment gearing into a pinion on the valve stem, whereas its short arm is operated upon by a frame attached to the pipe and moved by the expansion and contraction of the same, in such a manner that the motion of the valve is increased according to the proportion existing between the two arms of said lever. John Gunn, of Worcester, Mass., is the patentee.

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ROMANCE OF THE STEAM ENGINE.

ARTICLE XXII.

STEVENS—TREVITHICK—STEPHENSON.

When we reflect that the railway system is of such recent growth; that since 1830, 10,000 miles have been built in England, 34,000 in America, and 15,000 in other countries, we may well regard such achievements as surpassing those put forth by all the writers of romance. Whatever credit may be justly due to various inventors of the steam engine, we believe that to George Stephenson we are more indebted than to any other man for the development and great progress of railways. In our last article we gave a sketch of his life; we will now give some account of the difficulties which he had to surmout to insure success.

It was the successful working of the Liverpool and Manchester Railway that really laid the foundation of the railway system. This road met with the most formidable opposition when a bill was brought into Parliament to obtain a charter for its construction. On its third reading in the House of Commons, Sir Edward Stanley moved to defer its reading for six months, in order to defeat the bill, as a part of the line ran through his estate. In the course of his speech in favor of the motion, Sir Edward Stanley asserted that the trains could only be worked by horses, and it would take ten hours to make a journey of thirty miles. Sir Isaac Coffin seconded the motion and denounced the railroad as a most flagrant imposition. He would not consent to see widows' premises invaded by it; "and how," he asked, in quite a senatorial manner, "would any person like to have a railroad under his parlor window? What was to be done with all those who had advanced money to make or repair turnpike roads, and what is to become of those who may wish to travel in their own carriages after the fashion of their forefathers? What was to become of coachmen and harness makers, horse breeders and dealers, if railroads were to be allowed? Was the House of Commons aware of the smoke and noise, and the hiss and the whirl which locomotive engines might make passing at the rate of ten or twelve miles per hour? Neither the cattle plowing in the fields, nor grazing in the meadows, could behold them without dismay. Railroads would raise the price of iron one hundred per cent, or probably would exhaust the iron altogether. This railroad would be the greatest nuisance, the most complete disturbance of quiet and comfort in all parts of the kingdom that the ingenuity of man could invent."

It is really amusing as well as instructive to revive a recollection of the enlightened wisdom which belonged to such members of Parliament as old Sir Isaac Coffin. The bill, however, passed the House by a two-thirds vote, and it was carried almost unanimously in the House of Lords; in fact its only opponents in this, the great aristocratic branch of the Parliament, were the old Earl of Derby and his relative, the Earl of Wilton. This speaks volumes for the superior intelligence of the British Peers.

When George Stephenson was examined by a committee of the House of Commons, as to the practicability of constructing and working this railroad, several members thought he was crazy. When asked by one at what speed an engine could draw a carriage upon a railroad, he replied "ten or twelve miles at the very lowest." This was followed by a sort of chuckling laugh on the part of the wise legislators who really believed that the great but humble genius whom they were then examining was more fit for Bedlam than building railroads.

At this time George Stephenson was the most practical railroad engineer in the world. What little had been done in constructing such roads was perfectly known to him; he was therefore chosen engineer to build the line which had to be carried through Chat Moss, a deep and extensive quagmire. To accomplish this was thought, by men of science in those days, to be an impossibility; but the genius of Stephenson was fit for the occasion. He laid and built this railroad, and made the locomotive *Rocket*, which took the prize and gave positive and permanent success to the railway system.

The public opening of the Liverpool and Manchester Railway took place on the 15th of September, 1830, and it was considered a great national event. The Duke of Wellington, Sir Robert Peel, and many other distinguished persons were present, and the engine that carried them sped along at the rate of 17 miles an hour, to the astonishment of all the spectators, who had never seen anything run faster than stage coaches. Seven locomotives had been built for the opening—all upon the basis of the *Rocket*—with multitubular boilers and the blast in the chimney. On this occasion a melancholy accident took place; Mr. Huskisson, M.P., the great patron of the railroad and the person who had pushed the bill for its charter through Parliament, was killed by being run over by the *Rocket* engine, while standing for a few moments on the track. His body was placed upon the locomotive, which dashed off with it to Eccles, distant fifteen miles, when it went at the astonishing speed of 36 miles per hour. This velocity surprised Stephenson himself; it was a new and unlooked-for phenomenon, and probably to this we may also attribute the more rapid spread of railways. It was anticipated that the speed of the engine on this railroad would be ten miles an hour, and that its business would be heavy traffic, such as coal, cotton and timber. The managers did not intend to rely on passenger traffic, as the stages used to go at the rate of ten miles per hour on the turnpike. But the great speed of the *Rocket* opened all eyes to a new system of passenger travel, and during the first eighteen months after its opening, 700,000 passengers were carried on it without a single accident. The stage required four hours to go over the same distance; the locomotive only occupied one hour and a half. This was an important difference, and since then railways have become the only agencies of public inland passenger travel in all civilized countries. What a mighty revolution has been effected by railways!

Freaks of the Fungi.

The fungus is a kindly friend, says the London *Athenæum*, and a fearful foe. We like him as a mushroom. We dread him as the dry rot. He may be preying on your roses, or eating through the corks of your claret. A fungus has eaten up the vine in Madeira; the potato in Ireland. A fungus may creep through your castle and leave it dust. A fungus may banquet on your fleets, and bury the payment of its feats in in lime. Fungi are most at home upon holes of old trees, logs of wood, naked walls, pestilential wastes, old damp carpets, and other such things as men cast out from their own homes. They dwell also in damp wine cellars, much to the satisfaction of the wine merchant, when they hang about the walls in black, powdery tufts, and much to his dissatisfaction when a particular species, whose exact character is unknown, first attacks the corks of his wine bottles, destroying their texture, and at length impregnates the wine with such an unpleasant taste and odor as to render it unsalcable; more still to his dissatisfaction when another equally obscure species, after preying upon the corks, sends down branched threads into the precious liquid, and at length reduces it to a mere *caput mortuum*.

Sand Pillars.

Atkinson, in his travels in the Amoor country, says:—"I have often witnessed a phenomenon on the sandy plains of Central Asia, which accounts in some measure for the innumerable sandy mounds that are found in some regions. When seen at a distance, for the first time, it made a strong impression on my mind. About twenty pillars were in view, wheeling round and licking up the sand. As they passed along, a cloud of dust was raised on the ground, apparently eight or ten yards in diameter. This gradually assumed the form of a column that continued to increase in hight and diameter as it moved over the plain, appearing like a mighty serpent rearing its head aloft, and twisting his huge body into contortions in his efforts to ascend. The others fifty, sixty and one hundred feet, and some ascended to nearly two hundred feet. As the whirlwinds began gathering up the dust, one might have fancied that antediluvian monsters were rising into life and activity. The smaller ones seemed to trip it lightly over the plain, bending their bodies in graceful curves as they passed each other; while those of large dimensions revolved with gravity, swelling out their trunks as they moved onward, till the sandy fabric suddenly dissolved, forming a great mound, and creating a cloud of dust that was swept over the desert.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING APRIL 23, 1861.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

1,106.—J. E. Ambrose, of Lena, Ill., for an Improvement in Lamps:

1 claim, first, The employment or use of the water chamber, C, communicating through a stoppered opening with the body or fountain, A, of the lamp and arranged to operate substantially as and for the purpose set forth.

Second, The arrangement of the springs, k k, shaft, g, and wheels, h h, substantially as shown, for elevating and lowering the wick, as described.

Third, The combination with the cone, K, of the short tube, I, adapted and employed in the manner set forth, for the attachment of movable inner deflectors of various forms.

Fourth, The plate, N, provided with the slot, s, and pendents, t, operating in connection with the outer cone or deflector, K, in the manner and for the purposes set forth.

[This invention relates to a new and improved lamp for burning parafline and the various coal oils in use. The object of the invention is to obtain a lamp which will burn the materials above specified without chimney, and one which is portable or may be used as a hand lamp and carried, while burning, from place to place without smoking or emitting a disagreeable odor.]

1,107.—D. S. Anderson, of Trenton. N. J., for an Improved Apparatus for Making Roofing Cloth:

I claim the hollow callenders, D D, combined with the paper rollers, E E, the distributing rollers, B B, and regulating rollers, C C C', in connection with the receptacles, A A, provided with radiating steam pipes, g g, or their equivalents, when arranged as described with, in, and for the principal specified.

1,108.—Charles Bailey, of Batavia, Ill., for an Improved Arrangement of Threshing Cylinder, Corn Sheller and Grinding Mill:

I claim so constructing the cylinder of a threshing machine as to form one head thereof, a corn sheller, and crusher, and on the end of its shaft, a grinding mill, when the whole is arranged substantially in the manner and for the purpose set forth.

1,109.—Henry Bailey, of Columbia, Maine, for an Improved Washing Machine:

I claim the arrangement and application substantially as described of each stock or beater with respect to its swing bar, pitman, and crank, whereby the conjoint action of the said parts, the beater during its forward motion over the bottom of the tub is caused to receive a tilting movement, by which its toe is borne downward on such bottom, substantially in manner and for the purpose set forth.

1,109.—E. F. Barnes. of Brooklyn, N. Y., for an Improvement in Railroad Chair and Splice:

I claim the combination and arrangement of the chair, A, and splice B, in connection with the rails, C C, substantially as and for the purposes set forth.

1,111.—John A. Brock, of Chicago, Ill., for an Improved Mining Pan:

I claim a mining pan, as described, having a supplementary plate or disk fitted into the interior thereof, for the purpose of collecting and holding the mercury used in the framing operation, in a fixed position, as and for the purposes set forth.

1,112.—J. F. Brown. of Columbus, Ga., for an Improvement in Cotton Gins:

I claim the improved saw gin having its separate parts, viz., its hopper, breast, two sets of saws and brush, constructed and arranged in relation to each other, and so as to operate together, substantially as described.

1,113.—Daniel Broy, of Canton, Mo., for an Improvement in Seed Planters:

I claim the arrangement of the double perforated slide, F, inclined cap, L, tubes, I, cutting wheels, D, and lever, G, with the flat bottomed grooved wheels, B, and adjustable tongue, J, in the manner and for the purpose shown and described.

[The object of this invention is to arrange a seed planter, which will open furrows, drop the seed, and cover it over, with ease and facility, and which allows of regulating the depth, to which the furrows are opened, in a simple, sure and ready manner.]

1,114.—M. L. Callender, of New York City, for an Improvement in Lamps:

I claim the bifurcated wick tube, f, and its arms, e e', by which two wicks can be elevated or depend simultaneously.

Second, I claim the combination of the cap, b b', the deflector, c c', and the cap, d d', with the bifurcated wick tube, f, and its arms, e e', and the bifurcated shield, a a', with its arms, y y', for supplying the interior of the flame with a current of heated air, and the outer surfaces of the flame with currents of cool air, for the purpose and in the manner specified.

1,115.—C. F. Chickering, of New York City, for an Improvement in Square Pianofortes:

I claim the combined arrangement of the wrest plank, hitch plate brace and sound-board and of the open or merely barred portion of the case, in a square pianoforte, substantially as and for the purposes described.

1,116.—J. L. Clough, of Suffield, Conn., for an Improved Floor Clamp:

I claim, first, The jaw plates, A and B, connected by one or more bars, C C' when constructed substantially as shown and used for the purpose substantially as described.

Second, The combination of the lever, D, pressure bar, E, and jaw plates, A and B, substantially as described.

1,117.—Francis Comtesse, of New York City, for an Improved Device for Protecting the Hulls of Vessels from Cannon Balls:

I claim the employment of convex rounded shields A, attached to the sides of a vessel by means of loops, a, and eye bolts, b, or by any other equivalent means, substantially as and for the purpose shown and described.

[This invention consists in the employment of a series of convex rounded shields of iron or steel plate or of any other suitable material and attached to the sides of a vessel by means of eyebolts and loops or in any other desirable manner, and so that the edges of each succeeding shield overlap those adjoining, for the purpose of protecting the vessel, and rendering it proof against any cannon ball which may hit it.]

1,118.—A. O. Crane, of Hoboken, N. J., for an Improvement in Boots and Shoes:

I claim, first, A boot or shoe heel composed of two, three or more "lifts or risers," and clamped and held together by conical rivets, which

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serve the double purpose of protecting the heel from wearing away, and of holding the "lifts or risers" tightly clamped together, as described.

I also claim the holding of a heel to a boot or shoe by means of a conical nut, e, and a screw, f, for the purpose and in the manner set forth and described.

1,119.—George Crompton, of Worcester, Mass for an Improvement in Looms:

I claim controlling the operation of the picker staffs, substantially as and for the purpose specified.

1,120.—John Danks, of Troy; N. Y., for an Improvement in Burners for Purifying Gas:

I claim the employment as filling for a chamber, B, applied in combination with a burner, substantially as described, of hemp or flax saturated with nitric acid, as set forth.

[This invention consists in furnishing a gas burner with a chamber filled with hemp or flax saturated with nitric acid, said chamber being so arranged that the gas, on its way to the external orifice or orifices of the burner, is caused to pass through the interstices between the fibers of the hemp or flax, by which it is prevented blowing through the burner and passing off unconsumed.

1,121.—E. P. Drake, of Greenbush, N. Y., for an Improved Boring Machine:

I claim a series of forked rods or bars, G G G G, connected to the radial arm or lever, F, which slides upon the guard, E, substantially as and for the purpose specified.

1,122.—Stewart Elder, of Buffalo, N. Y., for an Improved Spring Bed:

I claim supporting and holding the springs, A, by means of the frame, B, placed midway between the springs and connected thereto, substantially as described, for the purposes set forth.

I also claim extending the frame, B', beyond the area of the springs, in order to incline the base of the springs, as shown at G, and also to incline the cords, as shown at h, and thereby adapt the same to the purposes of a pillow, substantially as set forth.

1,123.—J. A. Emerick, of Philadelphia, Pa., for an Improvement in Stopping and Starting Railroad Cars:

I claim, first, The sliding frame, E, with its V-shaped ribs, the central pulleys or wheels, D D, having V-shaped grooves, and being secured to the axles of the car, the levers, G G, or their equivalent, and the spring, M, of the form represented or any other convenient form; the whole arranged as and for the purpose set forth.

Second, I claim the locking lever, N, arranged in respect to the sliding frame, as and for the purpose specified, and operated by the devices described or their equivalents.

1,124.—C. W. Emerson, of Albany, N. Y., for an Improvement in Cultivators:

I claim the peculiar-formed concave cutters, G, on the lower ends of the edged uprights, F; with the racks, H, side beam, C, standard, L, rake, N, bars, E, and wheels, B; the whole being constructed and arranged for operation conjointly as and for the purpose described.

1,125.—E. J. Fraser, of Kansas, Mo., for an Improvement in Plows:

I claim the arrangement of the levers, N l O, and detents, P Q, with each other and with the slotted bar, L, rod, M, cords, k p, and plow, in the manner and for the purposes shown and described.

[The object of this invention is to attach a plow to the axle of a pair of wheels in such a way that the plow will, while performing its work be allowed to conform to the inequalities of the ground, and therefore operate in a perfect manner in all cases where the sulky plow may be advantageously used. The invention also has for its object the ready adjustment of the plow as well as its ready attachment to the sulky and detachment therefrom.]

1,126.—G. P. Gordon, of Brooklyn, N. Y., for an Improvement in Printing Presses:

I claim, first, Giving to such rocking platen a straight movement to and from the form or type, for the purpose of giving an impression, as fully described.

Second, I claim the platen having the motions described, in combination with a stationary bed.

Third, I claim bringing the face of the rocking platen or rocking tympan, when the sheet is being taken, into an angle from the horizontal position, substantially as described and for the purpose specified.

Fourth, I claim the combination of the sheet-taking nippers with a rocking platen, and these in combination with a feed table, and all of these in combination with the sheet-holding grippers, operating substantially as described, for the purposes set forth.

Fifth, I claim lifting the printed sheet substantially as specified for the purpose specified.

1,127.—Charles Greenawalt, of Seiberlingville, Pa., for an Improvement in Water Wheels:

I claim, in reaction tub wheels, the use and arrangement of the half buckets, e, in the manner set forth.

I also claim the offset, m, when used with the buckets, a a, arranged and operating as set forth.

1,128.—John Gunn, of Worcester, Mass., for an Improved Steam Trap:

I claim, first, the employment or use of a rotary valve, C, in combination with the expanding and contracting pipe, A, substantially in the manner and for the purposes shown and described.

Second, The arrangement of the pinion, D, and lever, g h, or their equivalents, in combination with the frame, E, pipe, A, and valve, C, constructed and operating substantially in the manner and for the purposes specified.

1,129.—F. B. Hall, of Hartford, Conn., for an Improved Instrument for Registering Reciprocating and Rotary Motion:

I claim, first, The combination of the three toothed wheels, B C and D, with the pinion, F, all operated by a worm, A, or means equivalent, when so arranged as to indicate the whole number of revolutions and decimal parts of a revolution of these respective wheels, by means of a dial upon the face of the wheel, D, or on any equivalent surface or surfaces, for the above or equivalent purpose.

Second, I claim the combination of three toothed wheels and a pinion (related to each other in the same or equivalent manner as may be the said wheels and pinion mentioned in the above claim), when so arranged relatively to the face of the wheel, D, as to be operated by a worm on an axle, E, or by means equivalent, for the above or equivalent purpose,

1,130.—J. R. Harrington, of New York City, for an Improvement in Carpet Linings:

I claim a lining or wadding for carpets and other purposes, made without the use of paste or any glutinous substance, substantially as described for the purpose set forth.

1,131.—A. C. Jones, of Philadelphia, Pa., for an Improved Pipe Joint:

I claim a packing ring of flexible material formed substantially as described and interposed between the ends of two pipes, so formed in respect to the ring that the latter shall form a self-packing and yielding joint, as set forth.

1,132.—W. Kuhlenschmidt, of New York City, for an Improvement in Button Fastenings:

I claim the needle-pointed, conical, spiral spring, A, attached to the inner side of a button, B, or other similar article, as and for the purpose shown and described.

[The principal object of this invention is to obviate the necessity of cutting a hole in the fabric for the purpose of attaching a button, stud, brooch, or other fastening to a garment, by means of a coil of wire attached to the inner side of said button, and also to retain the button firmly to the fabric after it has been attached, and prevent its wabbling or swinging to and fro and thereby becoming loose.]

1,133.—Donald Mann, of Rochester, N. Y., for an Improvement in Rotary Spading Machines:

I claim arranging the drums or rollers, a b c, with their endless chains, C, in the separate frame, B, substantially as and for the purposes set forth.

1,134.—H. B. Masser, of Sunbury, Pa., for an Improvement in Ice-cream Freezers:

I claim securing the cream receptacle, C, within the ice vessel, A, and attaching the latter by a swivel connection or pivot, E, to the base, D, to admit of the turning of the ice vessel and cream receptacle on the base, substantially as and for the purpose set forth.

I also claim constructing the pivot, E, with a recess, b, in its upper end, to serve as a step for the shaft, F, when said pivot thus arranged, applied and used for the purpose specified.

1,135.—James McCollum, of Brownsville, Ala., for an Improvement in Subsoil Plows:

I claim, first, The adjustable brace, c, pivoted at d and i, to the double pivoted bars, b b and g g, and secured to the bars, b b, substantially as and for the purposes described.

Second, The curved coulter, C, with its head, m, screw pin, l, and nut, l', in combination with the rack bars, g g, as and for the purposes described.

[This invention relates to certain improvements in adjusting the shovel of a subsoil plow, and in securing the shovel and its coulter to the adjustable frame, for the purpose of regulating, in a simple manner, the depth to which it is desired to stir the subsoil—at the same time affording a substantial brace to the coulter and shovel.]

1,136.—T. S. Mills, of Iberia, Ohio, for an Improvement in Seeding Machines:

I claim constructing the seed slide, F, of two parts, a b, one part, b, being adjustable by means of the screws, c c, and provided with slides, G, which are fitted in recesses, d d, in the part, a, and also arranged so as to be capable of a separate or independent adjustment in the recesses, d d, by means of the screws, e e, substantially as and for the purpose set forth.

[This invention relates to an improved seeding machine of that class which is designed for sowing various kinds of seed. The object of the invention is to obtain a seed-distributing device which may be readily adjusted so as to be capable of sowing different kinds of seeds, and in greater or less quantities, as may be desired.]

1,137.—H. W. Mosher, of Warren, Ill., for an Improvement in Coffee Pots:

I claim, first, The arrangement of the breast, a, annular chamber, b, and hollow brace, B, in combination with the boiler, A, constructed and operating as and for the purpose set forth.

Second, The arrangement of the air space, f, with inclined sides, h i, in combination with the water space, g, and boiler, A, constructed and operating in the manner and for the purpose set forth.

[This invention consists in the arrangement of a breast or air space in the upper part of the boiler, and communicating with a hollow brace between the body of the boiler and the spout, in such a manner that a portion of the steam or vapor rising from the boiling liquid in the pot or boiler is condensed on passing through said air space and hollow brace, and returned to the boiler in a liquid state; also in the arrangement of a conical air space around and in the center of the cold water condenser, in such a manner that the condensation of the steam or vapor rising from the liquid in the boiler is facilitated, and the full flavor or aroma is retained.]

1,138.—John Patterson, of Indianapolis, for an Improvement in Cheese Presses.

I claim the arrangement and combination of the two lugs, 2 and y, with the forked lever, b, b, b, the upright piece, f, f, the notch or curvature, x, the slot, m (or its equivalent), the pin, l, l, the hand lever, n, the tightening wire hoop, u, u, the pin, v, and the stop holes, s, s, as and for the purposes set forth.

1,139.—Eduardo Juanes y Patrullo, of Merida, Yucatan, Mexico, for an Improvement in Machines for Dressing the Leaves of Axgave Americana.

I claim the arrangement of the endless slatted apron, C, b, in combination with the beaters, B, constructed and operating substantially in the manner and for the purpose shown and described.

[Engraving will appear in two or three weeks.]

1,140.—John C. Pitel, of Meriden, Conn., for Improved Clock Escapement.

I claim the use of the detent, or repose pallet, e, and projecting point, g, in combination with a suitable lifting pallet (as c), when the whole is constructed, arranged and fitted to produce the result, substantially as described.

1,141.—John Ramsey and A. B. Smith, of Clinton, Pa., for an Improvement in Guides for Cutting Out Pantaloons:

We claim the arrangement of the central, rigid guide plate, C, the movable ratch plates, D, E, springs, G H, and pins, g, g, applied to and in combination with the strips, A and B, substantially as and for the purposes herein specified.

We also claim, in combination therewith, the point, I, of the movable strip, B, with the pivoted adjusting bar L, substantially as and for the purpose set forth.

1,142.—Samuel Reynolds, of Duquesne Borough, Pa., for an Improved Handle for Hoes:

I claim the use of the socket, or ferrule, shank, bearing heads or straps, and rivet, when made in one piece, as described and for the purpose set forth.

1,143.—Charles Robinson, of Cambridgeport, Mass., for an Improved Clothes Dryer:

I claim the tube, C, provided with the slot, i, and side notches, g, g, in combination with the suspension rod, D, and pin, h, or its equivalent thereon, when the said tube is suspended from the ceiling of a room, or other equivalent suspension surface, substantially as and for the purposes specified.

1,144.—John Rogowiski, of New York, N. Y., for an Improved Night Reading Desk:

I claim the arrangement and combination of a reading desk, A, with stops, e, e, and clasp, f, clamp C, horizontally adjustable rod, B, rotary sleeve, D, and vertically adjustable rod, E, all constructed and operating substantially in the manner and for the purpose shown and described.

[The object of this invention is to provide a reading desk, combined with a clamp to hold a gas burner or candle, and attached to arms which are adjustable in a vertical and lateral direction, said desk being furnished with adjustable stops to prevent the book from sliding down over the sides of the desk, and with a sliding clasp overlapping the upper edge of the book, and intended to hold the pages down; the whole being attached to a suitable stand in such a manner that the desk can be readily and conveniently adjusted for a person wishing to read while lying in bed or on a couch.]

1,145.—R. E. Rogers and James Black, of Philadelphia, Pa., for an Improvement in the Method of Combining and Utilizing Steam and Air:

We claim, first, The method of combining and utilizing steam and air, as set forth.

We claim the valve, x, or its equivalent, in combination with the other parts of the aspirator, as described.

1,146.—E. T. Shepard, of Gallipolis, O., for an Improved Washing Machine:

I claim the arrangement of a series of rings, C, secured to a rotary axle, D, by means of springs, E, and suspended in a swinging frame, F, in combination with the rotary-slatted cylinder, B, constructed and operating substantially in the manner and for the purpose shown and described.

[This invention consists in the arrangement of a series of rings, each of which is supported by four (more or less) springs, secured round the circumference of a rotary shaft, having its bearings in a swinging frame, in combination with a slatted rotary clothes cylinder, in such a manner that the several rings bear on the surface of the clothes wrapped round the slatted cylinder, and that on rotating said cylinder the clothes are carried through the rings, which latter, by means of the springs supporting them, accommodate themselves to the inequalities in the surface of the clothes.]

1,147.—Calvin Shepherd, of Chenango, N. Y., for an Improvement in Water Elevators:

I claim the sliding plate, J, pawls, g, g', and ratchet wheels, h, h', in combination with the drum, and axle and the two buckets, when the same are arranged in the manner and for the purposes described and shown.

[The object of this invention and improvement is to operate two pawls, which are used to keep either end of the bucket in an elevated position when filled, so that one pawl can be thrown off at the same time and by the same movement which throws the opposite pawl on its ratchet wheel.]

1,148.—John E. Smith, of Waterbury, Conn., for an Improvement in Buckles:

I claim a buckle, or clasp, consisting of the loop part, figs. 3 and 4, with its rib or projecting edge, e, in combination with the main plate, A, when the parts are constructed, connected, and fitted to produce the result, substantially as described.

1,149.—John K. Smith, of Trenton, N. J., for an Improvement in Steam Plows.

I claim, first, The arrangement of the segments, L', M, on the bolster plates, F, N, of the axles of the wheels, C, E, the cords, e, f, the pulleys, c, d, and wheel K, of lever, L, and the wheels, J, J, on axle, G, for the purpose of guiding or turning the machine, as set forth.

Second, The arrangements of the ratchets, O', on axle G, cords j', passing over the pulleys, j', and attached to frame B, in connection with the frames, A, B, connected together, as shown, whereby the inner or front end of frame, B, and, consequently, the spade cylinder may be elevated when desired.

Third, The employment or use of the weight, T, suspended on the axle, s, in connection with the tangs, l, of the spades, R, and the springs, m, all arranged to operate as and for the purpose set forth.

1,150.—William W. Snow, of Jersey City, N. J., for an Improvement in Tires for Locomotive Wheels:

I claim a hollow or cored out cast iron tire for the drawing wheels of locomotives, when furnished with flanges, braces and brackets, and filled in with wooden blocks, or their equivalents, in the manner, and for the purposes set forth.

1,151.—Jacob Stuber and Frederick Frank, of Utica, N. Y., for an improvement in Lamps.

We claim the arrangement of an air chamber below the wick tube, formed by the perforated shell, D, communicating with the outer air through openings formed in its collar for that purpose, when such chamber is used in connection with a series of tubes or flues, through which the air is conducted to the inside of the cone, G, and by it directed in a steady current on the flame, thereby preventing flickering, by the jarring of the lamp, or from sudden currents of air striking the same.

We further claim, in combination with the devices above mentioned, the arrangement of a series of holes in the body, E, of the lamp, immediately above the flange of the cone for the admission of air to the flame, on the outside of the cone, so as to furnish the requisite amount of oxygen to complete the combustion of the oil.

And lastly, We claim, in connection with the devices above mentioned for the supply of oxygen to the flame, the perforated double button, F, by means of which the gaseous products of the flame and the oxygen are thoroughly mixed and spread, whereby a more perfect combustion is effected than by any other method now in use in circular wick lamps.

1,152.—Joseph Thomas, of New York City, for an Improvement in Lamps.

I claim, first, The construction and use, in coal-oil lamps, of two vertical or partially inclined passages, D, D', terminating at the top in such a form and so arranged in respect to the flat wick tube, as set forth, as to discharge, at right angles or thereabouts, to the plane of the wick, two currents of heated air partly upon the wick and partly upon the flame, and preventing the access of the air to the edges thereof, in the manner and for the purpose specified.

Second, The enlarged ends, H and H', of the opening, G, in the cap, E, the said ends being wider than that part of the opening in the cap through which the body of the flame passes, and extending down to points level, or about level, with the top of the wick tube, as represented and described.

1,153.—H. E. Toule, of Exeter, N. H., for an Improved Apparatus for Ascertaining the Curvature of the Keelson Bottom of Vessels:

I claim the girder, in combination with the vertical measuring rods, constructed and arranged substantially as described.

1,154.—J. G. Treadwell, of Albany, N. Y., for an Improved Coal Scuttle:

I claim the described coal scuttle as an article of manufacture, constructed substantially as and for the purpose set forth.

1,155.—D. B. Weite, of Providence, R. I., for an Improvement in Making Watch and Locket Rims:

I claim the making of watch and locket rims from metal tubings, substantially as described.

1,156.—Chester Bullock (assignor to himself and De Forest Weld), of Jamestown, N. Y., for an Improvement in Rakes for Harvesters:

I claim, first, The scraping bar, y, attached to the rake, s, as and for the purposes set forth.

Second, The reciprocating rear delivery rake and the detachable reciprocating side delivery rake, operating in combination in the manner substantially as and for the purpose described.

Third, The spring bar connection between the cross head rake, i, and the crank, j', arranged and operated as set forth.

1,157.—E. B. Coffin (assignor to himself and A. H. Sylvester), of Johnston, R. I., for an Improvement in Lanterns:

I claim, in connection with the cylinder, G, coal oil burner, E, and chimney, F, the valves, J, in the dome or chamber, I, the deflector or plate, H, in the cylinder, G, and the register, C, at the base of the lantern, when all are combined and arranged substantially as and for the purpose specified.

[The object of this invention is to obtain a lantern for burning kerosene or coal oil. The invention consists in the use of two air chambers applied to the lantern, and used in connection with an ordinary coal oil burner and glass chimney.]

1,158.—G. S. Curtis (assignor to himself and T. B. Bryan), of Chicago, Ill., for an Improvement in Skate Fastenings:

I claim the movable clamping plates, C C and E E, pivoted to levers, A B, respectively, and operated by the straps, a a', substantially in the manner and for the purposes set forth.

[This invention is a novel improvement in clamping skates to the soles of boots, whereby both pairs of clamps can be operated simultaneously, either to close and confine the soles, or to open and release the soles of the boot. The nature of this invention consists in giving a lateral sliding movement to the skate clamps by means of two horizontal levers, projecting forward and backward from the heel and sole clamps, respectively, and receiving straps on their ends which are buckled over the instep of the foot in effecting the clamping of the skate to the boot.]

1,159.—J. O. Farrell (assignor to himself and W. S. Hills and J. H. Hills), of Boston, Mass., for an Improvement in the Tailboards of Wagons:

I claim the notched sector bars, C C, vertical spring bolts, D D, arms, I I, and shaft, G, arranged and combined with hinged tailboard, B, and operating as a self-lock, as set forth.

[This invention consists in combining with a tailboard which is hinged to the bottom of a wagon body, two sector arms having notches in them at suitable distances apart, and two spring latches so arranged as to catch into the notches in the sector arms, and lock the tailboard in any desired position.]

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1,160.—John Magee, of Lawrence, Mass., assignor to himself and Wm. J. Town, of Newton, Mass., for an Improvement in Stoves:

I claim the peculiar arrangement of the air pipes or ducts, d d, and he partition, c, relatively to the oven, the stove case and the smoke space around the oven.

I also claim the particular arrangement of the air inlet pipes, E E, within and so as to form part of the fire pot or furnace.

I also claim the application of the cover, C, to the top of the stove by means of the side bar, D, and the standard, g, arranged and applied together, and with respect to the cover and stove or oven of the latter, substantially as described and represented.

1,161.—Joseph Stevens (assignor to himself and H. M. Currier), of Lowell, Mass., for an Improved Spring Bed Bottom:

I claim the combination of the slotted slats, E E, &c., the cross bars, D D, the lock bars, H H, and the springs, C C, &c., substantially as and for the purpose described.

1,162.—F. S. Stoddard, of Litchfield, Conn., assignor to Edward Coe, of New Haven, Conn., for an Improvement in Spinning Frames:

I claim the employment, in combination with top rollers, F F, of the kind commonly used, of bottom rollers, G G, made with recesses, a a, in a portion of their fluted peripheries, but with a portion, c c, of said peripheries completely cylindrical, substantially as described, so that while they intermit the drawing operation and allow the twist to pass them, they keep the top rollers, F F, supported and drive them continually by friction.

1,163.—T. H. Dodge, of Washington, D. C., for an Improvement in Letter Paper:

I claim, first, Tinting a portion or all of the blank side of letter or note paper, for the purposes stated.

Second, Combining with the blank side of the sheet of letter or note paper thus tinted, of the official embossed postage stamp or mark, in such relative position as respects the sheet, as that when the same is folded up the stamp will occupy a position at the right upper corner of the letter, as and for the purposes set forth.

Third, Leaving the margin, D', in combination with tinting the portion, A, as and for the purposes set forth.

1,164.—C. K. Myers (assignor to himself and John Cohenour), of Pekin, Ill., for an Improvement in Corn Planters:

I claim the arrangement of the bars, B B', coulter, k s n n' p, and discharging mechanism, f g h i, the whole being coustructed and operating in the manner described.

RE-ISSUES.

70.—G. A. Cox, of Brooklyn, N. Y., for an Improvement for Bonnet Fronts. Patented Jan. 17, 1860:

I claim providing the former, A, with the grooved rims, I and I', and interstices, i i, in the manner shown and for the purpose set forth.

Second, In combination with the same, I claim the frame composed of the parts, D E and F, when arranged and operated as specified and for the purpose set forth.

71.—Philander Shaw, of Boston, Mass., for an Improvement in Air Engines. Patented May 2, 1854; re-issued July 17, 1860:

I claim the described auxiliary heater, constructed and arranged as set forth, the exhaust air and the products of combustion being passed through in one direction while the cold air from the force pump is passed through in the other, by which means the heat is extracted from the heated air and smoke, and transferred to the cold air on its way to the engine, the latter being pumped in against a pressure much less than that at which it is worked off from the main heater, as explained.

Second, I claim passing the exhaust air which has propelled the piston directly through the fire for the purpose of economizing heat, as set forth.

Third, In combination with a tight ash pit into which the air for the support of the combustion within the furnace is forced, I claim a chamber, D, communicating with the ash pit and surrounding the furnace for the passage of a portion of the air not required by the fire, which, combining with the products of combustion in the chamber, E, passes off through the flue, G, for the purpose of economizing heat, as set forth.

Fourth, I claim the arrangement described of the tubes within the piston rod, the reservoir, R, and the india-rubber tubes, S S', for the purpose set forth.

NOTE.—The above list of patents, issued for the week ending April 23, numbers fifty-eight. Of these, TWENTY-SEVEN—more than one-third of the ntire number—were solicited through this office.—EDS.

Notes and Queries

W. H. R. M., of S. C.—If you add about one pound of dissolved glue to every ten gallons of lime whitewash, it will adhere in a superior manner to outside buildings, and its appearance will not be altered, but you must not expect it to adhere like paint. A little sweet milk added will render it more durable.

A. G., of Va.—We believe that air may be forced into a shaft under such a pressure as to keep out inflowing water, and, at the same time, permit persons to work in the shaft. This principle is carried out in diving bells, in which men labor for several hours under a very high pressure of air.

D. H. S., of N. Y.—Mix a little Paris-white with white varnish and apply it to glass, and it will answer your purpose for admitting light, and will prevent persons peering through the windows. A ball of soft putty rolled over the surface of glass answers a similar purpose.

A. F. D., of N. Y.—We do not know where you can obtain aluminum in bars, wire or plate. We should think some one would advertise it in our paper.

C. C., of Ga.—The pressure on the valve should be estimated by the area of the valve, not by the area of the ports. The pressure on any part of the face that is exposed to the steam should be deducted from the pressure on the back.

J. K., of N. Y.—Correspondents would save us a great deal of time if, instead of merely referring in a general way to articles which they have read in our columns, they would also mention the pages and the volumes in which they appeared. We have been unable to find the article to which you refer.

C. S., of Mass.—We think the preferred claim can be maintained; but, at the same time, we advise you to add an improvement if you can.

J. R. M., of Pa.—Dr. Gesner's work on the distillation of petroleum is the only one published containing the information you desire. It is published by Balliaire Brothers, Broadway, this city.

G. L. G., of Conn.—Hydraulic cement is the best which you can use to place at a moderate depth under the surface of the ground to keep rain out of your cellars.

J. R. M., of Texas.—We have received your letter, and expect to see you in this city, as you have promised, at an early date.

T. L. W., of N. Y.—If you suspect that your beeswax is adulterated with white resin, stearic acid or white lead, melt a portion of it in hot water, when the wax will float on the surface, while the resin, stearic acid, &c., will subside. The presence of starch may be detected in wax by adding a few drops of an iodine solution to the water in which the wax is melted. Iodine forms a blue color when it combines with starch, not with wax.

H. L., of Chicago.—The water which has come into your cellar may not have passed through the brick walls, but have come up under them, through the floor. If the walls be coated on the inside with good hydraulic cement or hot pitch, the water will not penetrate through them. If the water comes up through the cellar floor, you must lay a concrete floor on it, made of hydraulic cement and gravel.

W. C., of Ind.—An alloy made of 9 parts copper and 1 of tin is excellent for the sides of steam engines. Four parts copper to one of tin makes a harder alloy, and may suit your purpose better. We prefer the harder alloy when the pressure upon it is great; the soft alloy when the pressure is light.

A. W., of Conn.—The enameling upon jewelry is produced by fusing powdered colored glass with the blow pipe. The colored glass used for this purpose is very fusible; it contains borax, and is laid in the indentations of the ring, or breastpin, &c., by the artist; then he exposes it to the heat of the blow pipe.

O. E. W., of Pa.—We have carefully considered your communication, and we believe that had Oliver Evans been a rich man he would have constructed a railroad, and have had it in operation, perhaps, in 1805; but you know this was not done. We can only relate those things which actually occurred. We have given Evans great credit for his inventive genius and ability.

G. B. S., of Ohio.—Springs for gun locks and other purposes are first raised to a cherry-red color in a clear fire, then plunged into cold water, or a brine of salt and water. This operation hardens them. In order to give them the proper temper, they are afterward placed in an iron box containing hot charcoal ashes, and set upon the hearth of a common forge. They are pushed under the ashes, taken out and examined occasionally, and when they have attained to the proper blue color they are cooled. Wipe the polished surfaces with a rag slightly moistened with oil before placing the springs in the iron box. This is the process by which the polished iron work on gun stocks is "blued."

W. B. H., of N. Y.—Galileo was not the inventor of the compass. In Duhalde's "General History of China," it is stated that the magnetic needle (compass) was used in China 1,040 years B. C. It was employed in navigation and the direction of armies during war. In 1260 A. C. Palus Venetus brought the compass from China to Italy. Some writers state that captains of vessels sailing on the Mediterranean Sea employed a very simple compass long before the Chinese one was brought to Europe. It consisted of a common sewing needle, touched with a natural loadstone, mounted upon a piece of cork, and permitted to float on water placed in a bowl of earthenware.

W. L., of Pa.—There is no published work upon woolen manufactnring, coloring and cloth-dressing.

C. T. B., of Ill.—Lead makes a good steam joint, and will answer your purpose very well. Air can be heated to the temperature of steam by passing it through a pipe in a furnace, almost as fast as you can force it in with a pump.

C. G. P., of Ind.—Copper and brass corrode slowly in water. The oyxd formed on their surface is deleterious when dissolved in water that is used for domestic purposes. An alloy formed of 1 part of copper and 2 of tin will suit your purpose for making faucets, as it will not oxydize readily in water.

T. A. B., of N. Y.—A little oxalic acid rubbed upon the inkspots, and then moistened, will take ink out of your book.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, April 27, 1861:—

S. R., W., of N. Y., $20; J. N. W., of Pa., $20; C. H. B., of Pa., $40; J. L. A., of N. Y., $25; P. K., of Conn., $22; W. D., of Mo., $30; C. & C., of N. Y., $15; L. C., of N. Y., $10; J. H., of N. Y., $25; J. B. S., of N. Y., $25; E. C. of of N. Y., $22; J. B. J., of Minn., $15; J. F. H., of N. Y., $10; W. C., of Iowa, $30; M. D. W., of Ind., $25; E. C., of N. Y., $12; G. R., of N. Y., $25; H. B., of Conn., $31; I. J. E., of Mass., $30; J. H. M., of Vt., $15; A. C., of N. H., $10; K. H. C. P., of Iowa, $15; J, C. T., of N. H., $15; C. Van N., of N. Y., $15; M. C., of Iowa, $12; B. H., of Ind., $15; A. K. T., of Mich., $30; S. R. H., of N. Y., $25; L. & W., of Mass., $30; D. L., of Mass., $15; N. B., of N. Y., $40; L. H. H., of Ill., $15; F. R., of Inp., $15; J. McA. G., of O. G. B., of N. Y., $25; E. H. C., of Mich., $25; J. C. & C. N. M,, of Ill., $10; R. W., of Pa., $15; W. S. K., of Conn., $25; J. B., of Ill., $15; J. N. H., of N. Y., $15; D. N. D., of N. J., $22; J. W., of Ind., $25; N. M., of Ohio, $50; B. & J., of Kansas, $15; J. N., of N. Y., $25; E, R. W., of Iowa, $30; W. C. C., of Wis., $10; E. B., of Mich., $15; D. P. F., of Mass., $15; J. D., of N. Y., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending April 27, 1861:—

J. C. & C. N. M., of Ill.; G. M., J., of Ill.; J. B., of Ill.; O. G. B., of N. Y.; J. B. S., of N. Y.; E. R. W., of Iowa; M. D. W., of Ind.; J. C. S., of Mass. (2 cases); A. B. C., of N. Y.; A. C., of N. H.; A. M. H., of Conn.; M. C., of Iowa; J. W., of Ind.; E. B., of N. Y.; W. C., of Iowa; G. R., of N. Y.; J. L. A., of N. Y.; W. S. K., of Conn.; N. M., of Ohio (2 cases); J. H., of N. Y.; J. K., of Conn.; D. N. D., of N. J.

New Books and Periodicals Received.

THE AMERICAN ENGINEER.—Our cotemporary commenced its third volume last week, in an entirely new and rather handsome dress. Its editor and publisher, J. C. Merriam, gives us a characteristic poem, entitled "Worcester's Dream." The "Engineer" is devoted to steam engineering, and contains much information on such subjects.

HUNT'S MERCHANTS' MAGAZINE.—This old and substantial publication has recently changed hands, Messrs. Wood having sold it to William B. Dana, Esq., formerly of Utica, N. Y. The April number of the "Magazine" is remarkably rich in matter. It has the new Tariff Act in full, a very intelligent article on quarantine, complete statistics of marine losses in 1861, and the usual variety of miscellaneous articles. It is a work of great value to all who are engaged in mercantile and commercial pursuits.

A NEW SYSTEM OF PAPER CURRENCY; by Lysander Spooner. Boston: A. Williams & Co.; Ross & Tousey, No. 121 Nassau-street, New York. This is a pamphlet of 58 pages, developing an impracticable scheme for an irredeemable paper currency, based on mortgages. It is filled with the crudest notions; the author being so ignorant of the rudiments of political economy as to confound currency and capital together as being the same thing. A similar plan was proposed in England by Dr. Hugh Chamberlain, in 1694-'95, and a charter was finally obtained from Parliament; but the completeness of its failure was ludicrous.

THE HOUSEHOLD MUSICAL ALBUM has just been issued by Messrs. Alexander Harthill & Co., of this city. It contains a collection of twenty-one polkas and songs, which we have no doubt are meritorious, though we confess we never danced a polka in our life; and as for song-singing, we enjoy it much, but rarely take part except in the chorus, where we consider ourselves good, especially on the heavy parts.

THE HOUSEHOLD JOURNAL, Vol. I., bound in handsome style, is just ready, and for sale by the publishers, Alex. Harthill & Co., No. 20 North William-street, this city. It abounds in stories, poetry, wit and wisdom, and is altogether a good work.

LE CREDIT MINIER.—We have received the first number of a weekly paper with the above title, just established in Paris, for the purpose of urging the investment of capital in mining operations. It seems to be established by a banking house which acts as a broker to obtain loans for mine and metal workers. Characteristically of the French, it looks principally to government to develop the interest which it advocates.

RATES OF ADVERTISING.

Thirty Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS—PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, are now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the feesare also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patentsystem (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees, at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time, and on the most liberal terms.

Testimonials.

The annexed letters, from the last three Commissioner of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly, CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully, Your obedient servant, J. HOLT.

MESSRS. MUNN & CO.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention

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has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent, &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the government fee, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park-row, New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, to prepare arguments, and appear before the Commissioner of Patents or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors.*" Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars, address MUNN & CO., No. 37 Park-row, New York.

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1863, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

BINDING.—We are prepared to bind volumes, in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express or delivered at the office, 40 cents.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application to this office. Address MUNN & CO.,
No. 37 Park-row, New York.

TO ARCHITECTS.—THE BOARD OF SUPERVISORS of Kings county, having resolved to build a Court House for said county, the undersigned, by authority and on behalf of said Board, hereby invite architects who desire to compete for prizes to submit plans on or before 12 o'clock noon, on or before the third day of June next, to be deposited with A. H. Osborn, Clerk of said Board, at his office, No. 355 Fulton-street, Brooklyn.

The prizes will be $250 for the first; $125 for the second; $75 for the third; and $50 for the fourth; to be adjudged by the Board of Supervisors; they reserving the right to reject all, or to adopt portions of all those to whom premiums may be awarded.

Circulars giving the location and a diagram of the ground, the required accommodations to be provided in said building, together with the rules to be observed by those presenting plans for competition, may be procured of said clerk, or of either of the undersigned.

Committee.

STEPHEN CROWELL, No. 345 Fulton-street, Brooklyn, or
No. 62 Wall-street, New York.
WILLIAM COIT, No. 9 Court-street, Brooklyn.
JOHN GARRISON, corner Bushwick avenue and Cook-street.
WILLIAM J. CROPSEY, Fort Hamilton.
SAMUEL BOOTH, No. 66 Myrtle-avenue.
18 2

THE AMERICAN ENGINEER—A WEEKLY JOURNAL, devoted to the interests of Marine, Locomotive and Stationary Engineers. This paper is now in its third volume, and is enlarged to sixteen pages. Price $2; or five copies sent to one address for $5. The only Engineers' paper now published in the United States. Address JOHN C. MERRIAM, Editor, No. 2 Nassau-street, New York. 15 tf

BOOK ON PORTABLE ENGINES—"PRACTICAL INstructions for the Portable Engine, Enabling Every One to be His Own Engineer; by a Graduate of the Military Academy, and Former Member of the United States Corps of Engineers." A large illustrated pamphlet, sent by mail to any part of the country, price 25 cents, by the WASHINGTON IRON WORKS, Newburg, N. Y.

"The above establishment manufactures Portable Engines of all sizes, having the latest and most valuable patented improvements, and being an excellent combination of known devices for the production of a compact, efficient and cheap Portable Engine."—SCIENTIFIC AMERICAN. 13 8

FOR SALE—A FARM OF 40 ACRES, ON WHICH IS a saw and planing mill 20x84 feet, a building 35x48 feet; suitable for business; requiring large power; house, barn, orchard, &c. Building new; surplus of water power. Location first rate for a woolen factory. For particulars, address T. & H. READ, Ypsilanti, Mich. 18 3*

$100 PER MONTH CAN BE MADE WITH OUR $10 hand engraved stencil tools; everydie is made by a finished workman. WM. BARNARD & CO., Box 1,014, Cincinnati, Ohio. 18 3*

$8,000 WILL BUY A GOOD STEAM FACTORY, with Machinery and five acres of Land, in this city; the best location for a furniture, chair or agricultural implement manufactory in the West. For terms, address WM. FARGHER, Jr., Laporte, Ind. 17 3*

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WHITNEY'S LATE IMPROVED TIN AND SHEET iron workers, machines, ratchet and geared drilled stocks.—The only machines that always have cast steel rolls, and any party that is purchasing machines for their own use should be sure the rolls are cast steel if they wish great durability. They have many advantages not included in any other make of machines. They are warranted in every respect, and will be sold at price satisfactory to all that are in want of good machines. Please address A. W. WHITNEY, Woodstock, Vt. 18 2*

N. E. HALE, MANUFACTURER OF PATENT BELT Hook Pliers and Belt Punch, Nashua, N. H. 15 11*

LABORATORY OF INDUSTRIAL CHEMISTRY.—Advices on Chemistry applied to Arts and Manufactures, Agriculture, &c.; Commercial Essays. Address Professor H. DUSSAUCE, Chemist, New Lebanon, N. Y. 1*

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No. 635 Chestnut-street, Philadelphia, Pa.
Agent for the Swiss Drawing Instruments. 19 2*

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BRYANT'S COPYING INSTRUMENTS FOR ENLARGing or reducing pictures from two to nine times with positive accuracy, including Photographs, Ambrotypes, and Drawings from Nature. Price $1, and 24 cents extra for postage. Address E. K. BRYANT, Ballardvale, Mass. 19 2*

A MESSIEURS LES INVENTEURS—AVIS IMPORTANT. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous adresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence.
MUNN & CO., SCIENTIFIC AMERICAN Office, No. 37 Park-row, New York.

PORTER'S IMPROVED GOVERNOR.
The reputation of these governors is well established. Parties troubled with unsteady power may send for them in entire confidence. They never fail.
The numerous valves in use are all equally good, if well made; the form of the opening is immaterial. The governors are warranted to work perfectly with any and all valves, which move freely and close tolerably tight.
A style is made expressly adapted to waterwheels, to which they will give a perfectly uniform motion, under any variation of resistance.
I have long done with troubling my customers for certificates; but am able to refer to a large number of parties now using this governor in a majority of the States of the Union.
I will send a governor to any responsible party for trial. If it does not operate perfectly it may be returned.
A liberal discount to the trade, whose orders will always be promptly filled.
CHARLES T. PORTER,
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The Burning of Gosport Navy Yard.

ELEVEN VESSELS SCUTTLED AND BURNED—THE STEAM TUG "YANKEE" TOWS THE "CUMBERLAND" TO SEA.

On Saturday evening, April 21st, at 9 o'clock, the *Pawnee* arrived from Washington with 200 volunteers and 100 marines, besides her own crew, and at once the officers and crew of the *Pawnee* and *Cumberland* went to the Navy Yard and spiked and disabled the guns, and threw the shot and small arms into the river. At 10 o'clock, the marines, who had been quartered in the barracks, fired them, and came on board the *Pawnee*. This movement was premature, for it was the intention to fire all the buildings simultaneously. A party of officers, meantime, were going through the different buildings and ships, distributing waste and turpentine, and laying a train so as to blow up the dry dock. They were engaged in this work until two o'clock, when the train was fired. At 3 o'clock, the *Yankee*, to the captain of which, Charles Germain, much credit is due, came along and took the *Cumberland* in tow, the *Pawnee* taking the lead. All the vessels beat to quarters, the guns were manned, and everything was in readiness to carry out the threat of Commodore McAuley, that if a gun was fired from either shore, he would level both Portsmouth and Norfolk. At this time the scene was indescribably magnificent, all the buildings being in a blaze, and explosions here and there, scattering the cinders in all directions.

The government vessels had been scuttled in the afternoon before the *Pawnee* arrived, to prevent their being seized by the Secessionists, who had been in arms in both Norfolk and Portsmouth, under the command of General Taliaferro. Their number is estimated at some 1,400 men. The scuttling was done between 12 and 2 o'clock on Saturday. Lest this mode of destruction should not be complete, however, trains were laid on them and the vessels were fired with the buildings.

The following are the names of the vessels which were destroyed :—*Pennsylvania*, 120 gun-ship ; steam-frigate *Merrimac*, 40 guns ; sloop-of-war *Germantown*, 22 guns ; sloop *Plymouth*, 22 guns, frigate *Raritan*, 50 guns ; frigate *Columbia*, 50 guns ; *Delaware*, 84 gun-ship; *Columbus*, 180 gun-ship; *United States*, in ordinary; brig *Dolphin*, 8 guns ; and the powder-boat.

Of these the *Merrimac*, *Plymouth* and *Germantown* were ready for sea, but the *Pawnee* made her appearance at the yard too late to save them. The *Merrimac*, in fact, had had steam on only a few hours previously.

The *Yankee*, as we have already said, left the yard with the *Cumberland* in tow about 8 o'clock. The fleet proceeded down the river until 9 o'clock, when it came to anchor within a mile of the point where wrecks were known to have been sunk for the purpose of obstructing the navigation. Boats were sent out to take soundings in order to ascertain whether some other passage than the regular channel could not be found. All efforts proved unsuccessful, so the fleet raised anchor and forced their way directly through the wrecks. The *Cumberland* caught one of the sunken vessels and carried it along with her, and apprehensions were at first entertained that she might be carried on to Sewell's Point, where it was supposed the rebels had erected batteries. Meantime the *Keystone State* came up from Washington with marines, and by her help and that of the *Yankee*, the *Cumberland* was towed into deep water and the wreck disentangled. She then went up under protection of the guns of Fort Monroe and came to anchor. While the vessels lay there, four men, who had been employed in the Navy Yard, succeeded in making their way down the river, and reported that they left everything in flames, and the smoke and flames could easily be seen from the *Cumberland*. The rebels, too, they reported, were fearful of attempting to arrest the flames, because they apprehended that a train was laid to blow up the buildings.

The *Yankee* left on Tuesday morning for New York. She reports that the *Pawnee* and *Keystone State* had got the crew of the *Pennsylvania*, and the marines who occupied the barracks, on board, to carry them to Washington. Both left for the capital at 9 o'clock.

No vessels are allowed to leave New York harbor now between sunset and sunrise, an order to that effect coming from the Secretary of the Treasury. The rule is enforced by armed vessels in the Narrows and in Long Island Sound.

EXPLOSIVE RIFLE BULLETS.

The only superiority which breech-loading cannon has over those which are loaded at the muzzle, is that they are adapted for the use of explosive shells. We do not mean bomb shells, but those which are charged with powder and explode when they strike. Breech-loading rifles may be used for the same purpose in a most effective manner, and we revive our percussion explosive bullet, in order to draw attention to its destructive qualities. Fig. 1 is a section of it, and Fig. 2 represents it after striking and exploding. A is the hollow conical bullet, cast with a stem of lead, D ; or this stem may be a common screw nail placed in the mold to form a pin for the sabot. B is a hollow chamber filled with percussion powder, and C is a plug fitted in the opening. E is a sabot made of cork fitted in the stem, D, and two pieces of leather, F, are glued to the sabot, which would be a little wider than the bullet. Such an explosive missile as this may be used for breech-loading rifled cannon, and by having the sabot of greater diameter than the shell, the latter need not be made with lead bands around it.

When used for cannon, the plug, C, should be made of iron : for rifles the plug may be a small conical

Fig. 1

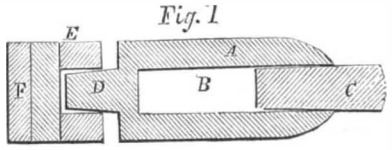
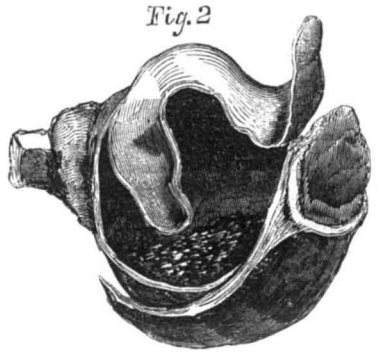


Fig. 2



glass tube filled with percussion powder. When the point of the bullet strikes an object, the plug ignites the percussion powder in the interior, B, and the shell explodes.

We would suggest an important improvement of General Jacobs on this explosive bullet, so as to render it as safe for carriage by a soldier as a common cartridge. It is this :—Instead of casting the bullet for a moveable plug, let it be cast for the insertion of a small conical fixed nipple, to be inserted after the shell is charged with the common powder, or gun cotton. When about to load the rifle with one of these shells, place a percussion on its point, and this, when it strikes, will ignite the charge inside.

The late General Jacobs, of the East Indian army, was a most consummate tactician for mounted riflemen. His troops were armed with double barrelled rifles, and were the terror of the natives during the great Indian rebellion. He made a host of experiments with explosive rifle balls; and he has frequently set ammunition wagons on fire at a distance of 1,200 yards with them. With the common rifle, by careful loading at the muzzle, General Jacobs also blew up caissons at 2,400 yards distance, at Enfield, England, in 1857, just with such shells.

In the Baden and Würtemberg German armies, rockets are used for small arms. These rockets are inclosed in copper tubes. Capt. Delvigne has also introduced these explosive bullets into the French army.

MAP OF THE SEAT OF WAR.—It is impossible to understand military operations without maps, and in order that our account of the great war now raging in the country may be intelligible, we accompany it with a remarkably plain plan of the present theater of hostilities. It shows clearly the relations of Harper's Ferry and the Gosport Navy Yard to Washington ; also, the line of communication now open from the North to the seat of government *viâ* Annapolis Railroad.

SOME 20 tuns of ammunition, including about 400,000 musket cartridges, have been sent from the Watertown (Mass.) Arsenal to Harrisburg, Pa.

POWDER SEIZED.—A brigantine called the *Tornado* was seized, a few days since, by the Surveyor of this port, having on board 8,000 kegs of gunpowder. It seems she cleared from this port in December last, for New Orleans, and, in a gale of wind, lost her mast, and was obliged to put into St. Thomas in distress, where she was refitted as best she could be, the Captain not having the means to repair, and she returned to this city. The peculiar circumstances of the case led to the discovery of the nature of her cargo, and to its providential seizure.

SOLDIERS' COMFORT.—Opposite to our windows in the park, extensive temporary barracks have been constructed, for the accommodation of troops arriving in this city. The eating house is 400 feet long, and the wash room and bunk room is 200 feet. They are fitted with gas and Croton fixtures, and have three large ranges in the kitchen of sufficient capacity to cook for 2,000 men.

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